APPENDIX A

BEST MANAGEMENT PRACTICES
BITTERROOT NATIONAL FOREST

INTRODUCTION

Best Management Practices (BMPs) are the primary mechanism to achieve water quality standards (Environmental Protection Agency 1987). This Appendix describes the Forest Service BMP process in detail; it lists the key Soil and Water Conservation Practices (SWCP) selected for use on the Bitterroot National Forest and describes each SWCP that may be refined to address site-specific conditions. This process determines project level BMPs that protect beneficial uses and meet water quality objectives. It also cross-references the Montana Department of Natural Resource Conservation BMPs (State BMPs) that each SWCP addresses, contains information related to implementation and planning review, and lists the contractual clauses needed to make the SWCPs a legal requirement in a timber sale. The appendix also addresses the effectiveness of selected BMPs.

BMPs include, but are not limited to, structural and non-structural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation). Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and technical and economic feasibility.

The Bitterroot National Forest Plan states "Soil and Water Conservation practices will be a part of project design and implementation to ensure soil and water resource protection" (Forest Service Handbook 2509.22, Forest Plan, pg II-25). Montana State Water Quality Standards require the use of Reasonable Land, Soil, and Water Conservation Practices (analogous to BMPs) as the controlling mechanism for nonpoint source pollution. Use of BMPs is required in the Memoranda of Understanding between the Forest Service and the State of Montana as part of our responsibility as the Designated Water Quality Management Agency on National Forest System (NFS) lands.

The Practices described herein are tiered to the practices in FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet Forest and State water quality objectives.

BMP IMPLEMENTATION PROCESS

In cooperation with the State, the USDA Forest Service primary strategy to control nonpoint sources is implementation of preventive practices (BMPs) determined necessary to protect identified beneficial uses.

The Forest Service Nonpoint Source Management System consists of:

1. BMP selection and design based on site-specific conditions; technical, economic and institutional feasibility; and the designated beneficial uses of the streams.
2. BMP application before, during and after land management activities;
3. BMP monitoring to ensure the practices are implemented and effectively protect designated beneficial uses.
4. Evaluation of BMP monitoring results.
5. Applying monitoring results to current/future activities and BMP design. The District Ranger is responsible for insuring that this BMP feedback loop is implemented on all projects.

1. ***BMP Selection and Design.*** Forest Plans identify water quality goals. These goals meet or exceed applicable legal requirements, including State water quality regulations, the Clean Water Act, and the National Forest Management Act. Project environmental assessments are tiered to Forest Plans during the NEPA process.

   The project interdisciplinary team selects the appropriate BMPs. After identifying the designated beneficial uses for the associated streams, the initial list of BMPs is developed from the Forest Plan standards and guidelines, Forest Service handbooks, and special provisions identified by watershed and fisheries specialists for sensitive areas.
   BMP selection and design are dictated by water quality objectives, soils, topography, geology, vegetation, and climate. Environmental impacts and water quality protection options are evaluated and alternative mixes of practices are considered. A final collection of practices are selected that not only protect water quality but meet other resource needs. These final selected practices constitute the BMPs.

2. ***BMP Application.*** The BMPs are translated into contract clauses, special use permit requirements, project plan specifications, and so forth. This ensures that the operator or person responsible for applying the BMP is actually required to apply it. Specialists review timber sale contracts to insure needed resource protection is included as appropriate legal clauses. Pre-sale crews and engineers take the site-specific BMP prescriptions from plan-to-ground during harvest unit and road layout through marking, tagging, flagging, tagline surveys, and locating road drainage and stream crossings. This is when final adjustments to fit the BMP prescriptions to the site are made before implementing the resource activity.

3. ***BMP Monitoring.*** During the course of project activities (e.g. timber harvest or road construction), timber sale administrators, engineer representatives, and resource specialists ensure that the BMPs are implemented according to plan. BMP implementation monitoring is done before, during, and after resource activity implementation. This monitoring answers the question: Did we do what we said we were going to do? Once BMPs have been implemented, further monitoring is done to evaluate if BMPs are effective in meeting management objectives and protecting water beneficial uses. State water quality standards, including beneficial uses, are one of the evaluation criteria monitored.

4. ***BMP Monitoring Evaluation.*** The technical evaluation of monitoring described above determines how effectively BMPs protect or improve water quality. Water quality standards and conditions of the beneficial uses are one evaluation criteria. If the evaluation indicates that water quality standards are not met or beneficial uses are not protected, corrective action considers the following three components:

   A. The BMP: Is it properly designed, technically sound, and effective? Is there a better practice, which is technically sound and feasible to implement?
   B. The implementation program or processes: Was the BMP applied as designed? What factors were involved in partial, or lack of, implementation – inadequate personnel, equipment, funds, or training?
   C. State water quality criteria: Do the parameters and criteria used for effectiveness evaluation adequately reflect changes in water quality and beneficial uses?

5. ***Feedback.*** Response to BMP evaluation is both short- and long-term. Where corrective action is needed, immediate response is undertaken. Responses may include: modification of the BMP, modification of the activity, or ceasing the activity. BMP evaluations over the long-term may indicate trends that require responses or changes in management direction.

ITEMS COMMON TO ALL SOIL AND WATER CONSERVATION PRACTICES

Responsibility for Implementation: The District Ranger is responsible for ensuring the factors identified in the following SWCPs are incorporated into the correct timber sale contract provision, that the provisions are included in the timber sale contract, or public works contract through the inclusion of specific contract clauses, and implemented on the ground. Specific timber sale contract clauses are often included in the BMPs for further reference, and the clauses start with a "B" or a "C" followed by a number (e.g. B6.4).

Unless otherwise specified, the Presale Forester is responsible for insuring that the factors identified in the following SWCPs are incorporated into the correct timber sale contract B or C provision and that the provisions are included in the timber sale contract.

The Timber Sale Administrator or Engineering Representative are the official representatives of the Contracting Officer (COR) on timber sale and public works contracts, respectively. They are responsible for insuring that the contract clauses are properly administered.

Monitoring: As part of administering the timber sale or public works contracts , the Timber Sale Administrator and Engineering Representative monitor BMP implementation. Resource Specialists also monitor SWCPs and provide feedback to the contract administrators.

SOIL AND WATER CONSERVATION PRACTICES IN THE COMO FOREST HEALTH PROJECT

FORMAT OF THE SOIL AND WATER CONSERVATION

In this section, we list the SWCPs in a table followed by a more detailed description of their application to the Como Forest Health project. The table lists the class of SWCP, cross-references State BMPs, the timber sale contract clause that implements the SWCP, whether the SWCP applies to the project, and how the SWCP is implemented or reviewed. The following definitions assist with reviewing the table:

KEY: CLASSES OF SWCP (BMP)

A = Administrative
G = Ground Disturbance Reduction
E = Erosion Reduction
S = Stream Channel Protection/Stream Sediment Reduction
W = Water Quality Protection

ACRONYMS

SAM = Sale Area Map
SMZ = Streamside Management Zone
TSA = Timber Sale Administrator
TSC = Timber Sale Contract

REFERENCES

B clause – standard in all timber sale contracts
C clause – optional in timber sale contract, see “applicable” column for potential inclusion.
- numerical value, identifying number or dates determined by timber contract officer, specialist, EIS, or line officer during contract construction.
SWCP (Soil and Water Conservation Practice) number – From R1-R4 Soil and Water Conservation Practices Handbook, FSM2509.22
State BMP reference number from MTDNRC 2004 Best Management Practices for Forestry (PF_WAT_08, Trapper-Bunkhouse Project File)
Applicability – does this BMP/SWCP apply to this project?
Planning Review – how is the BMP implemented or addressed in environmental planning for this project?

The detailed description of the SWCPs applicable to the Como Forest Health project follows the format outlined below. Montana State BMPs are not referenced in the detailed descriptions.

Title: Includes the SWCP number and a brief title

Objective: Describes the SWCP objective(s) and the goals of implementation.

Effectiveness: Provides a qualitative assessment of expected effectiveness that the applied measure will have on preventing or reducing impacts on water quality. The SWCP is rated High, Moderate, or Low based on the following criteria:

A. Literature/Research (must be applicable to area)
A. Administrative studies (local or within similar ecosystem)
B. Experience (judgment of an expert by education and/or experience)
C. Fact (obvious by reasoned [logical] response)

Implementation: Identifies the range of site-specific water quality protection measures to be implemented and how the practices are expected to be applied.

Table A-1: Soil and Water Conservation Practices on the Bitterroot National Forest and in Como Forest Health Analysis Area.

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable ? Y/N	Implementation/Planning Review
Section 11 Watershed Management						
A	11.01	IV.A.1	Determination of Cumulative Watershed Effects	NA	Y	Completed during project planning, refer to DEIS
E	11.03	III.D.10	Watershed Improvement of Roads, OHV Trails and Skid Trails	C5.419#	Y	See watershed improvement list for project
A	11.05	IV.A.1	Wetlands Analysis and Evaluation	B6.61 B6.62 SAM B6.62 C6.62#	Y	Wetlands, SMZ, RHCA marked and excluded from harvest or equipment entry per mitigation (refer to DEIS), law and policy. Soil scientist will help mark any units identified in mitigation to ensure wetlands are properly identified.
A	11.09	III.E.6	Management by Closure to Use	C5.41#	Y	Specifics of closures and affected roads identified in TS Contract and enforced by TSA (timber sale administrator)
W	11.13		Sanitary Guidelines for Construction of Temporary Labor, Spike, Logging, Fire Camps and Similar Installations	B6.2	Y	Applicable only if camps are established during logging operation.

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable ? Y/N	Implementation/Planning Review
Section 13 Vegetation Manipulation						
G	13.02	IV.A.1., 2, 4, 5 IV.B.1	Slope Limitations for Tractor Operation (14.07)	C6.4#	Y	Tractor units identified in Unit Table, restricted to slopes less than 35% or 20% adverse.
G	13.03	IV.A.1 IV.B.1& 2	Tractor Operation Excluded from Wetlands, Bogs, & Wet Meadows	B6.61 B6.422 B6.62 SAM C6.62#	Y	INFISH prohibits and DEIS supports exclusion of tractors from RHCAs (wetlands, bogs, wet meadows). These areas will be excluded from harvest units.
E	13.04	IV.B.6 IV.C.1	Revegetation of Surface Disturbed Areas	B6.6 C6.601# C6.633#	Y	Revegetation would occur per TSC, seed mix identified by Forest Botanist and included in TSC.
W	none	IV.B.2 V.C.2,3, 7	Inclusion of INFISH (7/95) Recommendations	SAM B6.5	Y	Integral part of analysis - RHCA values and effects considered. Harvest/treatment must be benign or beneficial to fish.
E	13.06	IV.A.1, 4	Soil Moisture Limitations for Tractor Operations	C6.4#	Y	Summer ground-based operations will be completed on dry soil conditions, see soils report for details.
A	13.07		Pesticide Use Planning		Y	Incorporated in project planning and design. Addresses in terms of impacts, mitigation.
W	13.08		Apply Pesticides According to Label and EPA Registration Directions		Y	Mitigation and project design.
WA	13.09		Pesticide Application Monitoring and Evaluation		Y	Mitigation and contract administration
A W	13.10		Pesticide Spill Contingency Planning		Y	Project design and mitigation.
W	13.11		Cleaning and Disposal of Pesticide Containers and Equipment		Y	Project design, mitigation, compliance with laws, regulation and proper pesticide application.

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable? Y/N	Implementation/Planning Review
W	13.12		Protection of Water, Wetlands, and Riparian Areas During Pesticide Spraying		Y	Project design, mitigation compliance with laws, regulation and proper pesticide application.
	13.13		Controlling Pesticide Drift During Spray Application		Y	Project design, mitigation compliance with laws, regulation and proper pesticide application.
Section 14 Timber Harvest						
A	14.02	IV.A.2-6	Timber Harvest Unit Design (14.08, 14.10)	B6.422 C6.4# C6.6	Y	These provisions are only relevant after all presale (design) work is complete. Skid trails will be identified and authorized prior to use and will be about 120' apart, existing skid trails will be use when feasible. Winter yarding conditions specified in mitigation. Refer also to DEIS for mitigation and discussion on unit design.
A	14.03	IV.A.1 – 4, 6 & B.1 - 3	Use of Sale Area Maps for Designating Soil and Water Protection Needs	B1.1 B.42 B6.5 B6.42 B6.61 B6.62 C6.4	Y	SAM will identify protected stream courses, wetlands and riparian areas, slumps and other areas excluded from harvest
A	14.04	IV.A.1	Limiting the Operating Period of Timber Sale Activities	B6.65 B6.6 B6.31 B6.311 B6.312 C6.316# C6.6	Y	Normal operating seasons will be identified in the TSC. TSA will monitor conditions and enforce as needed.
A	14.05	IV.A.1	Protection of Unstable Areas	C6.4#	N	No unstable (mass-movement-prone) areas located during planning or fieldwork
A	14.06	II. (all) III.D.10	Streamside Management Zone Rules, Riparian Area Designation	B6.5 B1.1 C6.4# C6.41# C6.50#	Y	SMZ's are typically more narrow than RHCA's that will be marked and excluded from harvest.

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable? Y/N	Implementation/Planning Review
G	14.07	IV.A.2& 4	Determining Tractor Loggable Ground	B1.1 B6.42	Y	Initially determined during project planning in IDT discussions. Will be field checked during marking. Refer to mitigation, Soils and Watershed reports as well as BMPs 13.02, 13.03, 14.02, 14.03, 14.05, 14.06, and soil moisture limitations.
E	14.08	IV.A.2,4, 5	Tractor Skidding Design	B6.422 C6.4# C6.42#	Y	Mitigation indicates skid trail spacing, Unit Table lists units appropriate for ground based yarding.
E	14.09	IV.A.1, 2	Suspended log Yarding in Timber Harvesting	B6.42 B6.5(b) C6.4#	Y	BMP describes requirements for suspended (cable, helicopter) yarding. Applicable to all non-tractor units, determined by field review during planning stages.
A	14.10	IV.A.6, B.4	Log Landing Location and Design	B6.422 C6.422	Y	Potential landings have been identified and reviewed on the ground for accessibility, INFISH constraints. Mitigation describes treatment after use.
E	14.11	IV.B.4	Log Landing Erosion Prevention and Control	B6.6 B6.311 B6.64 C6.6 C6.601#	Y	BMP describes design of landings and post-use treatment to minimize erosion
E	14.12	IV.B.5& 6	Erosion Prevention and Control Measures During Timber Sale Operations	B6.6 B6.64 B6.311 C6.4 C6.6 C6.601#	Y	Various mitigations described in DEIS, yarding systems identified that minimize ground disturbance on sensitive areas.
E	14.15	IV.B.1,5 &6, IV.A.5	Erosion Control on Skid Trails	B6.6 B6.311 B6.65 B6.66 C6.4 C6.6 C6.601#	Y	Water bar spacing identified in BMP, skid trails no less than 120' apart, limit summer skidding based on soil moisture to reduce compaction and displacement.
E	14.16	IV.A.1& 5	Meadow Protection During Timber Harvesting	B1.1 B5.1 B6.422 B6.61 C6.4# C6.66	Y	Equipment will be prohibited from entering meadows.

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable? Y/N	Implementation/Planning Review
S	14.17	IV.A.1& 5	Stream course Protection (Implementation and Enforcement)	B1.1 B6.5 B6.6 C6.50# C6.6	Y	Stream courses will be identified on SAM, excluded from equipment entry (SMZ and INFISH), and excluded from treatment area or be identified as no treatment zone.
E	14.18	III.E.2, 8, IV.A.5, IV.B.4, 6	Erosion Control Structure Maintenance	B6.67	Y	TSC requires maintenance of erosion control structured by purchaser and is monitored by TSA
A	14.19	III.E.7, IV.A.5, B.4, 5, 6	Acceptance of Timber Sale Erosion Control Measures Before Sale Closure	B6.36	Y	Direction according to TSC and certification by TSA required prior to sale closing.
E	14.20	IV.C (all)	Slash Treatment in Sensitive Areas	SAM B6.5 C6.50# B6.7 C6.7 C6.71 C6.753	Y	No dozer-piling proposed, but potential excavator piling in some units.
A	14.22		Modification of the Timber Sale Contract	B2.37 B8.3	Y	Within TSC provision to modify contract for resource reasons.
A	14.23	IV.C.1	Reforestation Requirement	internal	Y	No reforestation needs identified.
G	NA	IV.C.3,4, 6	On-site Large Woody Residue and Soil Litter Retention	C6.7# C6.406#	Y	Silvicultural prescriptions specify the amount of woody materials to be left on site following treatments and is displayed in mitigation table. Soil scientist involved in final recommendations.
G	NA	VI. (all)	Winter Logging	C6.4#	Y	Purchaser may work in qualifying winter conditions at their discretion. Winter ground-based harvest is required in portion of unit 1. See soils section in DEIS for details.
Section 15 – Roads and Trails						
S	15.02	III.A,B,C III.D.5, IV.A.5	General Guidelines for the Location and Design of Roads and Trails	(124 prmt)	Y	Applies to any temp roads associated with project

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable? Y/N	Implementation/Planning Review
E	15.03	III.C.1, 7	Road and Trail Erosion Control Plan	B6.31, B6.5, B6.6, and C6.3	Y	Seeding and fertilizing of reconstruction would occur after disturbance, effectiveness monitoring would determine if reseeding is necessary. Maintenance of haul routes would occur as directed by TSA and TSC.
E	15.04	III.D.4 III.E.4,7	Timing of Construction Activities	B6.31 B6.311	Y	TSA will monitor conditions and restrict when needed to prevent adverse results.
E	15.06	III.D.7, III.E.2	Mitigation of Surface Erosion and Stabilization of Slopes	C6.601#	Y	No new road construction planned but temporary roads would be managed to prevent erosion and be stabilized prior to sale closure. Refer to DEIS for temporary road obliteration requirements.
E	15.07	III.C.1,5 III.D.2, III.E.2	Control of Permanent Road Drainage	B/C6.6 B6.65 C6.601 C5.31# C6.661	N	No new road construction associated with this proposal. Road improvement work would improve road drainage would be accomplished under a separate engineering contract.
E	15.08	III.D.1	Pioneer Road Construction		N	No permanent road construction.
E	15.09	III.D.2 III.E.7	Timely Erosion Control Measures on Incomplete Road and Stream crossing Projects	B6.6 B6.66 C6.6 C5.23# rd pkg	Y	As directed by TSA and mitigation.
E	15.10	III.D.3,8	Control of Road Construction Excavation & Side cast Material	B6.222 rd pkg	N	No new road construction. Straw bales would be used to control erosion for temporary construction, landings or other sediment disturbing activities.
S	15.11	VII.A. (all)	Servicing and Refueling of Equipment	B6.34 B6.341 B6.342	Y	Servicing of equipment will be excluded from RHCAs and appropriate sites will be authorized by TSA with input from specialists as needed.
S	15.12	III.A.5 IV.B.1	Control of Construction in Riparian Areas	B6.5 B6.61, C6.51, and C6.52. 124 permit	Y	No permanent road construction. May come into play if stewardship contract includes culvert replacement.

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable? Y/N	Implementation/Planning Review
S	15.13	III.E.5	Controlling In-Channel Excavation	C6.36, C6.52, and B6.5, 124 prmt	Y	No permanent road construction. May come into play if stewardship contract includes culvert replacement.
S	15.14	IV.A.(all) V.C.5	Diversion of Flows Around Construction Sites	B6.5, 124 permit	Y	No permanent road construction. May come into play if stewardship contract includes culvert replacement.
S	15.15	IV.A.(all) V.B.2, V.C.4	Stream crossings on Temporary Roads	B5.1 B6.5 C5.1 (124 permit)	Y	This BMP would cover temporary road construction stream crossings. No temporary roads planned in RHCA's
S	15.16	IV.A.(all) V.C.(all)	Bridge and Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)	B6.5	Y	Appropriate mitigation if culvert replacement required.
E	15.18	III.D.6,8	Disposal of Right-of-Way and Roadside Debris	B6.5, Rd pkg	Y	Appropriate mitigation for temporary road construction, and pre-haul maintenance.
E	15.21	III.D.1 III.E.1,2	Maintenance of Roads	C5.12 C5.31# C5.316# C5.314# C5.312# C5.41	Y	Engineering rep should be involved on newly graveled and upgraded roads to ensure protection of gravel surface during maintenance activities.
E	15.22	III.D.7	Road Surface Treatment to Prevent Loss of Materials	C5.31# (T-103) C5.314#	Y	As directed by TSA.
E	15.23	III.D.6 IV.B.1	Traffic Control During Wet Periods	B5.12, and C5.12	Y	As directed by TSA and made necessary by weather conditions.
E	15.24	III.E.3,4 VI.B.2	Snow Removal Controls	C5.316#	Y	Refer to TSC and mitigation. Requires specific road numbers - 363.
E	15.25	III.E.8	Obliteration of Temporary Roads	C6.632#	Y	Refer also to mitigation in DEIS for temporary roads.

Class	SWCP #	State BMP Ref.	SWCP Title	TSC Provision	Applicable ? Y/N	Implementation/Planning Review
Section 18 Fire Suppression and Fuels Management						
A	18.02	IV.C.2	Formulation of Fire Prescriptions	Not in contract – USFS crews	Y	Rx have been developed in IDT setting with specialist input and consideration of habitat type, existing vegetation, fuel loadings and position on landscape.
E	18.03	IV.C.8	Protection of Soil & Water from Prescribed Burning Effects	Not in contract – USFS crews	Y	Burning should only occur during Rx window to meet prescribed fire intentions. See soil mitigations in DEIS.
E	18.04	None	Minimizing Watershed Impacts from Fire Suppression Efforts	Not in contract – USFS crews	Y	Should a prescribed fire escape, resource advisor would advise suppression team of sensitive areas and resource concerns.
E	18.05	None	Stabilization of Fire Suppression Related Watershed Damage	Not in contract – USFS crews	Y	This practice would be applied in the event a prescribed fire escaped containment. A resource advisor would inform the fire suppression team of sensitive areas and resource concerns.

SWCPS DESCRIPTIONS

PRACTICE 11.07 - OIL AND HAZARDOUS SUBSTANCE SPILL CONTINGENCY
PRACTICE 15.11 - SERVICING AND REFUELING OF EQUIPMENT

OBJECTIVE: To minimize contamination of waters from accidental spills of fuels, lubricants, bitumen, raw sewage, wash water, and other harmful materials by prior planning and development of Spill Prevention Control and Countermeasure Plans.

EFFECTIVENESS: High based on reason, logic response , and observation.

IMPLEMENTATION: The Contracting Officer, Engineering Representative, or Timber Sale Administrator would designate the location, size, and allowable uses of service and refueling areas. They would also be aware of procedures to follow in case of a hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan (SWCP 11.07). Contract provisions CT6.34 Sanitation and Servicing and BT6.341 Prevention of Oil Spills are included in all timber sale contracts. BT6.341 requires the purchaser to prepare a spill prevention control and countermeasure plan, which shall meet applicable EPA requirements, including certification by a registered professional engineer. This requirement is implemented when the total oil or oil products storage exceeds 1,320 gallons, or when any single container exceeds 660 gallons.

PRACTICE 13.02 - SLOPE LIMITATIONS FOR TRACTOR OPERATION
PRACTICE 13.06 - SOIL MOISTURE LIMITATIONS FOR TRACTOR OPERATION
PRACTICE 14.02 – TIMBER HARVEST UNIT DESIGN
PRACTICE 14.07 – DETERMINING TRACTOR LOGGABLE GROUND
PRACTICE 14.08 – TRACTOR SKIDDING DESIGN

OBJECTIVE: To insure that timber harvest unit design would secure favorable conditions of water flow, maintain water quality and soil productivity, and reduce soil erosion and sedimentation during and following thinning and fuel reduction.

EXPLANATION: The recommendations in these practices are based on soil conditions and slope, which relate to erosion hazard. The objective of these practices is to minimize erosion by limiting tractor yarding to appropriate terrain and soils, and by designing skidding patterns to best fit the terrain. General slope limitations for tractor logging are 35% standard and 20% adverse (uphill).

All tractor units would be logged using designated skid trails. Equipment would occasionally leave the trails to access trees or accomplish other activities.

Logging may occur in either winter or summer (subject to applicable timing restrictions required for other resources, such as wildlife). Winter ground-based yarding required in a portion of unit 1 under Alternative 2. In all seasons, skid trails must be spaced about 120 feet apart. The goal is to occupy less than 15 percent of the harvest area, which includes soil disturbance from skid trails, temporary roads, and landings associated with either past activities or proposed activities.

All of the proposed units have less than 15 percent existing detrimental soil disturbance. Most of the existing soil disturbance is from old skid trails or roads, some of which can be reused.

All existing roads and skid trails would be reused to the extent feasible unless doing so would adversely affect soil, water, or other resources. If roads or trails cannot be reused, their extent must be considered when laying out additional skid trails.

To the extent possible, logging in summer would occur when the soils are drier than field capacity nearing the permanent wilting point, as determined by the hand feel method and observations of grasses and forbs, which is described in the Project Record.

Winter logging requires a combination of soil frost and snow depth sufficient to protect the soil from detrimental disturbance

Timber Sale Administrators will monitor soil moisture conditions prior to allowing equipment to begin operations in summer and monitor snow and temperature conditions prior to winter logging. This monitoring must be documented in the Timber Sale Daily Report.

All burn units would be ignited when burning conditions would maintain soil erosion and nutrient levels within the range of historic burns.

If monitoring after project implementation indicates that detrimental soil disturbances for a given treatment unit exceed or equal 15 percent, then all or a portion of the following actions will be used to begin the restoration of soil quality. Restoration would occur on sites with a high amount of detrimentally disturbed ground such as designated skid trails and landings:

Scarify heavily used skid trails and landings with the teeth on an excavator bucket to a depth of 2 to 4 inches. Subsoiling with a grapple rake (SGR) or excavator bucket (SEB) may be necessary if it is determined that subsurface compaction is root limiting. In these cases, the subsoiling would decompact the skid trail to the appropriate depth to allow for productive vegetative growth.

Plant Montana-certified weed free native grasses on the scarified soils as recommended by the Forest Botanist.

Plant native shrubs where needed to augment natural vegetation and scarification.

The site condition will be used to determine which of the above mitigations would be used. These mitigations do not result in instant restoration of detrimentally disturbed soils; rather they begin the restoration process.

All temporary roads (constructed and re-used existing templates) will be reclaimed after use, as soon as logistically practicable. The reclaiming of temporary roads will include removing any installed culverts or temporary bridges, re-contouring the entire road template to natural ground contour, and, to the extent feasible, placing the top soil back on the soil surface. Decompaction of the road bed will be completed on existing templates where topsoil materials are no longer available. Woody material should be placed on the recontoured/decompacted road where quantities in the immediate vicinity allow. The road reclamation will be completed with fertilization and seeding as specified by the Soil Scientist and Forest Botanist.

EFFECTIVENESS: High - Experience of Bitterroot NF Soil Scientist and Botanist; based on reason, logic and observation.

IMPLEMENTATION: The following features would be designated on the Timber Sale Area Map:

Project Specific BMPs would be implemented primarily with the use of timber sale contract clause CT6.4, or other appropriate contract provisions.

PRACTICE 14.03 - USE OF SALE AREA MAPS FOR DESIGNATING SOIL AND WATER PROTECTION NEEDS
PRACTICE 14.16 – MEADOW PROTECTION DURING TIMBER HARVESTING
PRACTICE 14.17 STREAM COURSE PROTECTION (IMPLEMENTATION & ENFORCEMENT)

OBJECTIVE: To delineate the location of protection and special treatment areas and ensure their recognition, proper consideration, and protection during project activities.

EFFECTIVENESS: High; the hydrologist, fisheries biologist, and soil scientist review the timber ale area map; based on reason, logic, and observation.

IMPLEMENTATION: The following features would be designated on the Timber Sale Area Map:

Stream courses (perennial and intermittent) to be protected under contract clause BT6.5
Special treatment zones (STZS) as needed as per contract clause CT6.62 (site-specific wetland protection measures).

PRACTICE: 14.06 - RIPARIAN AREA DESIGNATION

OBJECTIVE: To minimize the adverse effects on Riparian Areas from adjacent logging and related land disturbance activities.

EFFECTIVENESS: High; local monitoring, and experience of the soil scientist, hydrologist, sale administrator and interdisciplinary team (ID Team) are that these requirements and criteria are highly effective in minimizing soil erosion.

IMPLEMENTATION: The Riparian Area requirements are identified during the environmental analysis by the ID Team. The timber sale project is designed to include site specific recommendations for the prevention of sedimentation and other stream damage from logging activities. The environmental analysis will provide for planning of harvests to insure long-term health and revegetation of the Riparian Areas, while meeting shading, debris recruitment, and other management objectives. As appropriate, monitoring and evaluation will be identified in the environmental analysis documentation. The Presale Forester is responsible for the inclusion of the Riparian Areas in the Timber Sale Contract and on the Sale Area Map.

The certified Sale Administrator is responsible for contract compliance during harvest operations. Riparian area widths are determined by INFISH criteria and exceed MT DNRC requirements.

PRACTICE 14.09 – SUSPENDED LOG YARDING, LANDING LOCATION AND DESIGN

OBJECTIVE: To protect the soil from excessive disturbance and accelerated erosion and to maintain the integrity of the Riparian Area and other sensitive watershed areas.

EFFECTIVENESS: High; Local monitoring, and experience of the soil scientist, hydrologist, sale administrator, and ID Team members indicate these requirements and criteria are highly effective in minimizing soil erosion.

IMPLEMENTATION: During the environmental analysis, the ID Team identifies areas where suspended log yarding is needed. The specific systems are included in the contract and designated on the Sale Area Map by the Presale Forester. The Timber Sale Administrator oversees the project operation using the guidelines and standards established in the timber sale contract with reference to the environmental analysis documentation.

Suspended log yarding includes all yarding systems in which logs are partially or wholly suspended off of the ground. These systems include high-lead, skyline, helicopter, and balloon yarders. The systems are used on steep or unstable slopes and in Riparian Areas where tractors cannot operate. All of these systems cause less soil disturbance because there is less contact between the soil and heavy machinery. In most cases, these systems require fewer roads because they have a longer "reach". Fewer roads and less soil disturbance causes less soil and water resource impacts.

PRACTICE 14.10 - LOG LANDING LOCATION AND DESIGN
PRACTICE 14.11 - LOG LANDING EROSION PREVENTION AND CONTROL
PRACTICE 14.12 - EROSION PREVENTION AND CONTROL MEASURES DURING TIMBER SALE OPERATIONS
PRACTICE 14.15 - EROSION CONTROL ON SKID TRAILS

OBJECTIVE: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

EFFECTIVENESS: High; experience of the soil scientist, hydrologist, sale administrator, and ID Team indicate that these requirements and criteria are highly effective in minimizing soil erosion).

IMPLEMENTATION: Standard Timber Sale provision BT6.6 requires the purchaser to conduct operations in a reasonable fashion to minimize erosion. Additionally, specific erosion requirements would be spelled out in provisions such as CT6.4, CT6.6, CT6.601, CT6.62, and CT6.623. Project-specific BMPs would be implemented primarily through timber sale contract clause CT6.4, or other appropriate contract provisions.

The following criteria would be used to control or minimize erosion from landings and skid trails:

1. Landings:

   Maintain landings during periods of use in a manner that prevents debris and sediment from entering any streams.
   Landings would drain in a direction and manner that would minimize erosion and preclude sediment delivery to any stream.
   Standard timber sale contract provision B6.64 Landings requires that after landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to allow water to drain or spread.
   Landings would be seeded as needed with a mix approved by the Forest Botanist.

2. Skid Trails:

   Skid trails would be water-barred; the Timber Sale Administrator would designate the trail location and spacing (SWCP 15.25).
   Skid trails likely to produce sediment would be covered with slash and/or seeded with a mix of seed and fertilizer specified in CT6.601

PRACTICE 14.18 - EROSION CONTROL STRUCTURE MAINTENANCE

OBJECTIVE: To ensure that constructed erosion control structures are stabilized and working effectively.

EFFECTIVENESS: High; experience of the soil scientist, sale administrator, and ID Team members is that the following requirement is highly effective in minimizing soil erosion.

IMPLEMENTATION: Timber Sale Contract provision, BT6.66, requires that during the period of the contract, the Purchaser shall provide maintenance of soil erosion control structures constructed by the Purchaser until they stabilize. The Forest Service may agree to perform such structure maintenance under BT4.228 Cooperative Deposits, if requested by the Purchaser, subject to agreement on rates. Should the Purchaser fail to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the Purchaser accordingly. The Timber Sale Administrator would ensure that erosion control structures are working effectively.

PRACTICE 14.19 - ACCEPTANCE OF TIMBER SALE EROSION CONTROL MEASURES BEFORE SALE CLOSURE

OBJECTIVE: To assure the adequacy of required erosion control work on timber sales.

EFFECTIVENESS: High; reasoned, logical response or observation.

IMPLEMENTATION: Timber Sale Contract provision BT6.36, requires that upon the Purchaser's written request and assurance that contract work has been completed; the Forest Service shall perform an acceptance inspection. For erosion control work, "acceptable" means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. The Timber Sale Administrator would not accept as complete, any erosion control work that does not meet this criteria.

PRACTICE 15.02 - GENERAL GUIDELINES FOR THE LOCATION AND DESIGN OF ROADS AND TRAILS

OBJECTIVE: To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.

EXPLANATION: Several considerations must be incorporated into the location and design of roads and trails. These factors directly affect protection of water quality, soil, and other resource values. The following coordination instructions apply to all transportation activities:

A. Area Transportation Analysis and project planning will be completed using an interdisciplinary process, and the appropriate NEPA document will be prepared and tiered to the Forest Plan. Area Transportation analysis is an extremely effective tool to reduce overall road mileages and minimize potential resource impacts.
B. Location, design, and construction activities shall utilize appropriate technical resource staffs, when needed, to evaluate effects of transportation development and operations, and recommend mitigating measures to minimize adverse impacts.

C. Roads and trails will be located and designed to facilitate completion of the transportation system, serve specific resource management needs, fit the terrain, and minimize damage to improvements and resources. Fragile, unstable, sensitive, or special areas should be avoided.
D. Roads and trails should be designed based on traffic and safety requirements of anticipated use and to meet the overall transportation plan. The design shall incorporate features to prevent or minimize soil movement and sedimentation as well as undue disruption of water flow.
E. Stream crossing structures shall be designed to provide the most efficient drainage facility consistent with resource protections, importance of the road, legal obligations, and total costs. The design may involve a hydrologic analysis to determine runoff rates and volumes, flood conditions, velocities, scour, open channel shapes, approach topography, materials-foundation condition, and fish passage, as required. An economic comparison of various flood frequencies versus structure sizes and types is also considered.
F. Locate and design roads and trails to drain naturally by appropriate use of out-sloping or in-sloping with cross drainage and grade changes, where possible. Relief culverts and roadside ditches will be designed whenever reliance upon natural drainage would not protect the running surface, excavation, or embankment. Road and trail drainage should be channeled to effective buffer areas to maximize sediment deposition prior to entry into live water.

EFFECTIVENESS: High for new permanent or temporary roads; reasoned, logical response, or observation.

IMPLEMENTATION: During the environmental analysis, the ID team ensured that management needs, objectives, requirements, and controls are incorporated in the location and design of roads and trails. Mitigation measures needed to protect soil and water resources were identified in the NEPA process. Contract provisions will be prepared that meet the soil and water resource protection requirements.

PRACTICE 15.03 - ROAD AND TRAIL EROSION CONTROL PLAN

OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and maintenance activities through effective contract administration during construction and timely implementation of erosion control practices.

EXPLANATION: Land disturbing activities usually result in at least short-term erosion. Poorly designed, located, constructed, and maintained roads and trails are usually responsible for the majority of stream sedimentation problems associated with forest management practices. By effectively planning for erosion control, sedimentation can be minimized.

Roads and trails require a variety of erosion control measures. Many erosion control practices not only protect water quality but also maintain road prism integrity, reduce maintenance costs, and improve traffic characteristics. The location of the road or trail with respect to streams, beneficial uses of that water, soil, and geologic information and other site factors govern the degree of stabilization required. Stabilization usually includes a combination of practices that promotes the re-establishment of vegetation on exposed slopes, provides physical protection to exposed surfaces, prevents the downslope movement of soil, or controls road drainage.

Since a newly constructed road is most susceptible to erosion from seasonal precipitation, the timing of erosion control practices is of primary concern. Those practices that can be accomplished concurrent with road construction shall be favored as a means of immediate protection of the water resource

EFFECTIVENESS: Moderate – High; reason, logical response, and observation).

IMPLEMENTATION: Erosion control objectives and detailed mitigation measures are developed using an interdisciplinary approach during the environmental analysis. The contract specifications and provisions for the road or trail shall reflect these measures and objectives. When standard specifications do not provide the degree of mitigation required, the ID team will develop special project specifications.

Prior to the start of construction, the Purchaser shall submit a schedule for proposed erosion control work as required in the timber sale contract standard specifications. The schedule shall include all erosion control items identified in the specifications. The schedule shall consider erosion control work necessary for all phases of the project. The Purchaser's construction schedule and plan of operation will be reviewed in conjunction with the erosion control plan to insure their compatibility before any schedules are approved. No work will be permitted on the project until the Contracting Officer has approved all schedules.

The Contracting Officer or Engineering Representative shall ensure that erosion control measures are implemented according to the approved schedule and are completed in an acceptable fashion. Field reviews and on-site inspection by the Line Officer and/or Forest Engineer will identify any additional erosion control measures required to protect the streams that were not recognized during planning or design. Necessary correction measures shall be implemented immediately through normal administrative channels.

The following items may be considered as erosion control measures when constructed in a timely manner. To maximize effectiveness, erosion control measures must be in place and functional prior to seasonal precipitation or runoff.

A. **Measures to reestablish vegetation on exposed soils:** This is usually accomplished by seeding suitable grass and legume species in conjunction with mulching and fertilization. In some situations, treatments may include tree seedling planting or sprigging of other woody species.
B. **Measures which physically protect the soil surface from detachment or modify the topography to minimize erosion:** These treatments may include the use of dust oil or gravel on the road travelway and ditches and the use of mulches, riprap, erosion mats, and terracing on cuts, fills, and ditches. Temporary waterbars on unfinished roads and trails can effectively reduce sedimentation.
C. **Measures which physically inhabit the downslope movement of sediments to streams:** These measures may include the use of slash filter windrows on or below the fill slopes, baled straw in ditches or below fill slopes, catch basins at culvert inlets, and sediment basin slash filter windrows may be utilized in live water drainages where fish passage is not required and where peak flows are low.
D. **Measures that reduce the amount of soil disturbance in or near streams:** These measures may include dewatering culvert installation or other construction sites, and immediate placement of permanent culverts during road pioneering. Temporary pipes should not be allowed unless positive control of sedimentation can be accomplished during installation, use, and removal.
E. **Measures that control the concentration and flow of surface and subsurface water:** These may include insloping, outsloping, ditches, cross drains, under drains, trenches, and so forth.

PRACTICE 15.06 - MITIGATION OF SURFACE EROSION AND STABILIZATION OF SLOPES
PRACTICE 13.04 - REVEGETATION OF SURFACE DISTURBED AREAS

OBJECTIVE: To protect soil productivity and water quality at culvert removal and culvert upgrade sites by minimizing soil erosion.

EXPLANATION: This practice is used to stabilize disturbed area surfaces with vegetation. The type of vegetation to use is determined by evaluating soil fertility and water holding capacity, slope, aspect, landtype characteristics, climate, vegetation species characteristics, and project objectives. Based on field observations and interpretations, the ID Team selects the type of vegetation that meets many or most of the management objectives for the area; range, wildlife, timber, fuels, minerals, and aesthetics. Grass or

browse species (shrubs) may be seeded or planted between recently planted trees for erosion prevention, wildlife habitat enhancement, or other management needs.

EFFECTIVENESS: Moderate; reason, logical response, and observation

IMPLEMENTATION: The identification of disturbed areas and vegetation species mix are determined during the NEPA process. The responsible Line Officer assigns specific individuals to execute the project. Projects are subsequently monitored to assess the revegetation effectiveness, and need for follow-up action.

PRACTICE 13.07 – PESTICIDE USE PLANNING
PRACTICE 13.08 – APPLY PESTICIDES ACCORDING TO LABEL AND EPA REGISTRATION DIRECTIONS
PRACTICE 13.09 – PESTICIDE APPLICATION MONITORING AND EVALUATION
PRACTICE 13.10 – PESTICIDE SPILL CONTINGENCY PLANNING
PRACTICE 13.11 – CLEANING AND DISPOSAL OF PESTICIDE CONTAINERS AND EQUIPMENT
PRACTICE 13.12 – PROTECTION OF WATER, WETLANDS, AND RIPARIAN AREAS DURING PESTICIDE SPRAYING
PRACTICE 13.13 – CONTROLLING PESTICIDE DRIFT DURING SPRAY APPLICATION

PRACTICE: 13.07 – PESTICIDE USE PLANNING

OBJECTIVE: To incorporate water quality and hydrologic considerations into the Pesticide Use Planning Process.

EXPLANATION: The pesticide use planning process will be used to identify problem areas and the objectives of the project, establish the administrative controls, identify treatments and preventive measures, and incorporate the hydrologic considerations contained in SWCP 13.08 through 13.13. The NEPA process addresses these considerations in terms of impacts, mitigation measures, and alternative treatment measures. Project work and safety plans specify management direction.

Factors considered in pesticide selection are: purpose of the project, application methods available, target species, timing of treatment, pest location, size of treatment area, and need for repeated treatment. Practicability of application considers: registration restrictions, form and method of application, topographic relief and areas to be avoided, and social acceptance of the project. The degree of risk considers: hazard to humans, method of application, transportation and handling hazards, carriers needed, and chemical persistence.

EFFECTIVENESS: High; reason, logical response, and observation

IMPLEMENTATION: The interdisciplinary team evaluates the project in terms of potential site response, potential social and environmental impacts, mitigating measures needed to protect water quality, and the need and intensity of monitoring and evaluation. The responsible Line Officer then prepares the necessary NEPA documentation, Project Plan and Safety Plan. Depending on the pesticide use, (FSM 2151.04) the Forest pesticide-use coordinator or Integrated Pest Management Working Group or regional IP-MWG reviews the documents along with the Pesticide-use Proposal, form FS-2100-2, and makes recommendations for or against approval of the project.

REFERENCES: NFMA; NEPA; FSM 2150 and 2323; State Hazardous Waste Management Plans; see references in "Best Management Practices" Definition 05—2 and 3.

PRACTICE 13.08 – APPLY PESTICIDES ACCORDING TO LABEL AND EPA REGISTRATION DIRECTIONS

OBJECTIVE: To avoid water contamination by complying with all label instructions and restrictions.

EXPLANATION: Label directions for each pesticide are detailed and specific, and include legal requirements to use.

EFFECTIVENESS: High; reason and logical response.

IMPLEMENTATION: Constraints identified on the label and other legal requirements of application are incorporated into project plans and contracts. Responsibility for ensuring that label directions and other applicable requirement are followed rests with the Forest Supervisor or designate such as the Forest Pesticide Use Coordinator. For contracted projects, it is the responsibility of the Contracting Officer to ensure that label directions and all other requirements are followed.

REFERENCES: FSM 2150; Best Management Practice Definition (05—2 and 3).

PRACTICE 13.09 – PESTICIDE APPLICATION MONITORING AND EVALUATION

OBJECTIVE: To determine and document that pesticides have been applied safely and to provide an early warning for any contamination of water or non-target areas or resources.

EXPLANATION: This practice provides feedback on the placement accuracy, application amount, and any water contamination that might occur from pesticide use to minimize or eliminate hazards to non-target areas or resources. Monitoring and evaluation methods include spray cards, dye tracing, and direct measurement of pesticide in or near water. Type of pesticide, equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of competent laboratory analysis and applicable federal, State, and local laws and regulations are factors considered when determining the monitoring and evaluation needs.

EFFECTIVENESS: High; reasoned and logical response.

IMPLEMENTATION: The monitoring and evaluation of pesticide application is a component of SWCP 11.2. The need for a monitoring plan is identified during the Pesticide Use Planning Process/NEPA process. If determined necessary, this monitoring and evaluation plan will consider the same items as in SWCP 11.02. A technical staff familiar in pesticide monitoring will evaluate and interpret the monitoring results in terms of compliance, State water quality standards, and adequacy of project specifications.

REFERENCES: FSM 2150; Best Management Practice Definition (05—2 and 3).

PRACTICE 13.10 – PESTICIDE SPILL CONTINGENCY PLANNING

OBJECTIVE: To reduce contamination of water from accidental pesticide spills.

EXPLANATION: A contingency plan that contains a predetermined organization and immediate actions to be implemented in the event of a hazardous substance spill will be prepared. The plan lists notification requirements, time requirements for notification, how spill will be handled, and who will be responsible for clean-up. Factors considered for each spill are: specific substance spilled, quantity, toxicity, proximity of spill to waters, and the hazard to life, property, and the environment.

EFFECTIVENESS: High; reasoned, logical response, and observation.

IMPLEMENTATION: The Pesticide Spill Contingency Plan will be incorporated into the Project Safety Plan. The NEPA process will provide the means for including public and other agency involvement in plan preparation. The plan will list the responsible authorities.

REFERENCES: SWCP 11.07; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); FSM 6740, 7442, 7443, and 7460; Oil and Hazardous Substances Pollution contingency Plan for EPA Region 8 and 10, 7/26/85; R1 and R4 Emergency and Disaster Plan; Best Management Practice Definition (05—2 and 3).

PRACTICE 13.11 – CLEANING AND DISPOSAL OF PESTICIDE CONTAINERS AND EQUIPMENT

OBJECTIVE: To prevent water contamination and risk to humans from cleaning and disposal of pesticide containers.

EXPLANATION: The cleaning and disposal of pesticide containers and equipment must be done in accordance with Federal, State, and local laws, regulations, and directives, and in a manner which will safeguard public health, the beneficial uses of water, aquatic organisms, and wildlife. Containers are rinsed three times, the rinse water applied on the project area as soon as practical, and the containers taken to the designated disposal site. Application equipment is also rinsed and rinse water applied to the project site before the equipment is moved from the project area.

EFFECTIVENESS: Moderate; reason, logical response, and observation

IMPLEMENTATION: The Forest or District Pesticide Use Coordinator will locate proper rinsing and disposal sites, and will arrange for container disposal in an approved disposal site when pesticide is applied by Forest Service personnel. When the pesticide is applied by a contractor, the contractor is responsible for proper clean-up and container disposal in accordance with label directions and Federal, State, and local laws.

REFERENCES: SWCP 11.07; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); FSM 6740, 7442, 7443, and 7460; Oil and Hazardous Substances Pollution contingency Plan for EPA Region 8 and 10, 7/26/85; R1 and R4 Emergency and Disaster Plan; Best Management Practice Definition (05—2 and 3).

PRACTICE 13.12 – PROTECTION OF WATER, WETLANDS, AND RIPARIAN AREAS DURING PESTICIDE SPRAYING

OBJECTIVE: To minimize the risk of a pesticide entering surface or subsurface waters or affecting riparian areas, wetlands, or other non-target areas.

EXPLANATION: When applying pesticides, an untreated buffer strip will be left alongside surface waters, wetlands, and riparian areas. Factors considered in establishing buffer strip widths beyond minimums established by FSM and NEPA documents are: beneficial water uses, adjacent land use, rainfall, temperature, wind speed, wind direction, terrain, slope, soils and geology, vegetative type, and aquatic life. Other considerations include: persistence mobility, toxicity, and formulation of the pesticide, method of application, equipment used, spray pattern, droplet size, application height, and application pattern.

EFFECTIVENESS: High; reasoned, logical response, observation

IMPLEMENTATION: The interdisciplinary team and the Forest Pesticide Use Coordinator will identify and map protected areas during the NEPA process. Protection of untreated areas is the responsibility of the project supervisor for Forest Service applications and the Contracting Officer for contracted projects. The certified commercial applicators are briefed about location of protected areas. These areas are flagged or otherwise marked when necessary to aid in boundary identification.

REFERENCES: FSM 2526, 2527, 2245, and 2150; see references in **Best Management Practice** (05—2 and 3).

PRACTICE 13.13 – CONTROLLING PESTICIDE DRIFT DURING SPRAY APPLICATION

OBJECTIVE: To minimize the risk of pesticide contaminating non-target areas.

EXPLANATION: Pesticide spray applications will be accomplished according to a prescription that specifies the following: areas to be left untreated, buffer areas, type of spray and associated materials, equipment and method to be used, droplet size, spray height, application pattern, flow rate, terrain, and

weather. Hand spraying, with less associated risk, will have fewer application restrictions for drift than aerial spraying.

EFFECTIVENESS: High; reasoned, logical response, and observation

IMPLEMENTATION: The ID Team and the Forest or District Pesticide Use Coordinator prepare the prescription during the NEPA process. The Line Officer is responsible for designating a project supervisor who is responsible for ensuring the prescription is followed during application and for terminating application if the standards are exceeded.

REFERENCES: FSM 2150 and 2245; SWCP 13.12; Best Management Practice Definition

(05—2 and 3). Other BMPs

- A spill cleanup kit will be available whenever pesticides (herbicides) are transported or stored.
- A spill contingency plan will be developed prior to all herbicide applications. Individuals involved in herbicide handling or application will be instructed on the spill contingency plan and spill control, containment, and cleanup process.
- Herbicide applications will only treat the minimum area necessary for control of noxious weeds.
- No spraying will occur when wind velocity exceeds 6 miles per hour or as specified on the label.
- Do not spray if precipitation is occurring or is imminent.
- Do not spray if air turbulence is sufficient to affect the normal spray pattern.

For additional information on SWCP's, including Objectives and Effectiveness, refer to Forest Service Handbook 2509.22 on file at the Supervisor's Office or the West Fork Ranger Station.

APPENDIX B

Past, Present, and Reasonably Foreseeable Projects in the Como Forest Health Project Area

Project Name	Start Date	Finish Date	Objectives	Residual Conditions
Upper Lick Creek	1980			
Legacy Sale w/o name (akaSlick Lick Timber Sale?)	March 1984 (contract date)		Commercial harvest: 62 acres, 100% tractor yard.	
Lost Horse Ditch	1985	1986		
Rock Creek Fire	1987			
Rock Creek Fire Salvage	1988	1988	Salvage harvest: about 234 acres, yarded by helicopter?	6 acres clearcut in the Como FHP area
Lick Creek (#21 Nepa Library – SO)	DN August 1991; contract date 9/1991		Research Study (3 units, 410 acres) Single tree removal (12 units, acres) Spruce budworm,MBP, fuels hazard reduction (5 units, acres) Aspen regeneration (1 unit, acres) Old growth ponderosa pine perpetuation (2 units, acres) Actual commercial harvest: 515 acres; 100% tractor yarded.	
Elytroderma Study	August 1992	ongoing	Commercial harvest: 19 acres; yard with tractor and cable systems	
Lick Creek Visual Timber Sale	Contract 8/13/1992		Commercial harvest 19 acres. Tractor and cable yarded.	
Como Dam (# Nepa Library – SO)	1992?			
Trapper Peak Allotment (#59 Nepa Library – SO)	DN 5/27/1993	continuing	Combines three allotments into one allotment and institutes a rotational grazing system. Total permitted numbers and season is 90 cattle pair (417 animal unit months) between June 15th and September 30. Ten cattle pair graze in	Build 2 miles of fence in McCoy Creek to keep cattle out for 10 years. Delay turn out to June 15th or later to minimize effects on elk calving.

Project Name	Start Date	Finish Date	Objectives	Residual Conditions
			Lost Horse pasture between 6/15 and 7/31.	Cattle removed from Lost Horse Unit annually when the Big Ditch goes dry to minimize conflicts with Recreationists. Permittee salts & rides to ensure protection of sensitive areas and compliance with Forest Plan Standards. Implement rotational grazing system between Trapper and Upper McCoy Unit to reduce season long grazing impacts on the Trapper Creek area.
Lost Horse Road Reconstruction Project	DN December 1993		Install drainage and culverts on Lost Horse Rd Gravel road that is within 25 feet of Lost Horse Creek Gravel parking areas adjacent to the creek and erect barriers to prevent vehicles from parking adjacent to the creek Raise road grades in low areas with poor drainage	
Como Decks	1994			
Lost Research	1996			
Lick Creek House Log Timber sale	1996	1997	Commercial harvest of house logs on 215 acres.	Logged 182 acres of the 215 acres planned. Removed scattered mistletoe infested Douglas-fir.
Lick Creek/Lost Horse Timber Sale (#53 Nepa Library – SO)	12/12/1997 DN January 1997	12/2006 (sale closure letter)	Commercial thin or salvage 320 acres-DN. Actual commercial harvest: 218 acres Prevent MPB population increase, improve growth rate, remove dwarf mistletoe	Stand densities: Snag densities:
Como Lake Fuels Reduction (#121 Nepa	DM October 2001	Completed 2005	Reduce fuels on 130 acres between the north shore of Lake Como and the upper	

Project Name	Start Date	Finish Date	Objectives	Residual Conditions
Library – SO)			Como campground in the Rock Creek drainage. Project includes thinning, hand piling slash, burning hand piles, and low intensity underburn.	
Lake Como Shoreline Restoration (#126 Nepa Library – SO)	DM January 2002		Stabilize 100 feet of eroded bank at the accessible picnic area at Lake Como and stabilize spots along approximately ½ mile of shoreline.	
Lost Moose Hazardous Fuels Reduction Project	DM 2002	ongoing		North of Como FHP area
Lost Horse Bridge Maintenance (#127 Nepa Library – SO)	DM April 2002		Replace cap beam on the north end of bridge Replace bridge railings to meet safety standards Replace and extend the approach guardrails at each end of the bridge Remove asphalt running surface on the bridge deck and replace it with wooden running planks.	
Lick Creek Bridge Replacement[1]	DN May 2002		Replace existing bridge with a longer and wider span Improve road –stream alignment Reconstruct road approach to a log-truck standard	
Lost Horse Quarry (#237 Nepa Library – SO)	DM July 2008	October 31, 2008	Authorize removal of about 1,000 yards of free-use of mineral material to Ravalli County for highway improvement projects.	
North Zone TSI	DM 2008	ongoing	Non-commercial thin about 1,433 acres of the Bitterroot NF in Sawmill Saddle, Bear Creek, Lost Horse, Willow Mountain, Lake Como, Deer Mountain, and Skalkaho. Stocking will be reduced to 150 to 250 trees/acre by removing trees less than 7 inches DBH.	

Project Name	Start Date	Finish Date	Objectives	Residual Conditions
Como East Hazardous Fuels Reduction Project (overlaps Como CG project area	DM April 2009		Fuels reduction on 350 acres on the east side of Lake Como. Fuel reduction activities include: slashing understory fuels, hand piling slash, burning slash piles, and a prescribed understory burn. Timber harvest was not part of fuel reduction.	Unit 4 (110) was treated and burned; all other burning on hold until treatments in Como Campground DM are completed and the mountain pine beetle population declines.
Lick Creek SPA Roguing Project	DM March 2003; harvest start August 2011	Harvest finished January 2013; contract terminated March 2013	Remove insect or disease infested trees, trees with poor genetic characteristics (phenotypes), trees in direct competition with better seed producers, and trees past the age of prime seed production. Commercial thin: 43 acres. 100% tractor.	
Elk Bed Timber Sale (#188 Nepa Library – SO)	DM July 2004; contract 11/9/2004	Final timber sale contract inspection: 10/14/2010	{Non-commercial thinning of 208 acres Ponderosa pine restoration on 101 acres; residual stand density of 40-60 square feet of basal area/acre Underburn 70 acres of pine restoration and one thinned plantation. Lop and scatter slash in pine restoration unit 9 (31 acres).DM} Harvest under contract: Commercial thin 70 acres; 86% cut-to-length, yard with log forwarder; 14% whole tree yard yard with tractor FS force account: non-commercial thin in ponderosa pine plantations: 208 acres, non-commercial thin 31 acres.	
Como Campground	2/14/2012	Currently open	Commercial thin and sanitation-salvage harvest 210 acres; 100% whole tree yard with tractor	

[1]O:\NFS\Bitterroot\Program\1900Planning\1910NaturalResourcePlanning\completed_projects\02_lick creek bridge\ea docs

Appendix C

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APPENDIX D

GLOSSARY

ACTIVITY: A course of action or treatment that is undertaken to directly or indirectly produce, enhance, or maintain forest and range land outputs or achieve administrative or environmental objectives.

ACTIVITY AREA: Area within the project area where activities are proposed.

ACTIVITY FUELS: Fuels generated as the result of a timber sale or other vegetation treatments.

AERIAL FUELS: All live and dead vegetation located in the forest canopy or above the surface fuels, including tree branches and crowns, snags, moss and high brush.

AFFECTED ENVIRONMENT: The biological, physical, and human settings changed by the alternatives.

AGE CLASS: - An interval, commonly 10 years, into which the age range of trees or vegetation is divided into for classification. May also refer to general diameter classes and displayed as seedling, sapling, pole, mature etc.

AGGRADATION (DEPOSITION): When more sediment enters a reach than leaves it, there is a buildup of sediment. This is called aggradation or deposition.

AIR QUALITY: Refers to standards for various classes of land as designated by the Clean Air Act, P.L. 88-206: Jan. 1978.

AIRBORNE PARTICULATE: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Particulates include: windblown dust, emissions from industrial processes, smoke from the burning of wood and coal, and the exhaust of motor vehicles.

AIRSHED: Geographical areas identified by the Montana/Idaho Airshed Group with similar topography and weather patterns.

ALL TERRAIN VEHICLE (ATV): A type of off-highway vehicle that travels on three or more low-pressure tires; has handle-bar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator.

ALTERNATIVE: Management options for responding to the purpose and need for action and/or issues.

ANALYSIS AREA: The geographic area defining the scope of analysis for a particular resource. This area may be larger than the project area when effects have the potential to extend beyond the boundaries of the proposed action.

APPEAL: A request by any party dissatisfied with a decision of a Forest Officer to have that decision reviewed at a higher organizational level within the Forest Service and, where appropriate, by the Secretary of Agriculture.

APPROPRIATED FUNDS: Monies allotted or budgeted for departments to fund the job activities taking place for the fiscal year.

AQUATIC SYSTEMS: Biological and physical attributes and their interaction related to water.

ASPECT: - The direction towards which a slope faces, expressed in cardinal directions such as north, east, south, west.

AVAILABLE FUEL: The portion of the total fuel that actually burns.

BACKING FIRE: A slowly advancing fire that is burning into or against the wind or downslope. See head fire.

BASAL AREA: The area of the cross-section of a tree stem measured at 4.5 ft. above the ground. Basal area can be used to measure how much of a site is occupied by trees. Stand basal area can be described by the total basal area per unit area.

BENEFICIAL USES: Attributes that are considered useful products of the resource. They may include (but are not limited to): recreation, production of salmonid fishes, drinking water, power generation, and irrigation.

BEST MANAGEMENT PRACTICES (BMP): A set of practices which, when applied during implementation of a project, ensures that water-related beneficial uses are protected and that State water quality standards are met.

BIG GAME: Those species of large mammals normally managed as a sport hunting resource.

BIODIVERSITY: Biodiversity is the variety of life in an area, including all the processes of life. Included in this definition is genetic diversity in species; species richness; variety, patterns, and abundance of species communities and ecosystems at large geographical scales; and the processes whereby species interact.

BIOLOGICAL ASSESSMENT: Information (document) prepared by or under the direction of the federal agency concerning listed and proposed threatened and endangered species and proposed critical habitat that may be present in the action area and the evaluation of potential effects of the action on such species and habitats.

BIOLOGICAL EVALUATION: A documented Forest Service review of programs or activities in sufficient detail to determine how an action or proposed action may affect any sensitive species.

BIOMASS: The sum total of living plants and animals above and below ground.

BLOWDOWN: Trees that have been uprooted by the force of wind.

BOARD FOOT (BF): A unit of measurement equal to an unfinished board one square foot by one inch thick. Timber volumes are often expressed in terms of thousands of board feet (MBF) or millions of board feet (MMBF).

BOGS: Perennially saturated areas that usually have wetland and riparian plants surrounding them.

BOLE: The trunk or main stem of the above ground part of a tree.

BROADCAST BURN: Intentional burning within well-defined boundaries for reduction of fuel hazard, as a resource management treatment, or both. Also see Prescribed Burning.

BULK DENSITY: The mass of dry soil per unit volume, corrected for weight and volume of coarse fragments greater than 2mm in diameter.

BURN INTENSITY: See Fire Intensity.

BURN SEVERITY: See Fire Severity; Vegetation Impacts.

BURNING PERIOD: That part of each 24-hour period when fires will spread most rapidly. Most commonly 10:00 am to 4:00 pm.

CANDIDATE SPECIES: Species identified by the United States Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), which are considered to be candidates for listing under the Endangered Species Act.

CANOPY: The more or less contiguous cover of branches and foliage formed collectively by the crowns of adjacent trees. Layers of the canopy may be distinguished with each layer representing one story. For example, vegetation may be called single storied, two storied or multi storied.

CANOPY CLOSURE: The progressive reduction of space between tree crowns as they spread laterally; a measure of the percent of potential open space occupied by the collective tree crowns in a stand.

CANOPY FUELS: The live and dead foliage, live and dead branches, and lichen of trees and tall shrubs that lie above the surface fuels.

CAVITY: Hollows, which are excavated in trees by birds, used for roosting and reproduction by many birds and mammals.

CAVITY HABITAT: Standing dead trees, broken-topped live trees, and down logs used by wildlife species that excavate and/or occupy cavities in these trees.

CHAIN: A non-metric measure of distance common to land surveying, forestry and fire management. One chain equals 66 feet.

CLEARCUT HARVEST: Removal of the entire stand in one cutting with reproduction obtained either by planting or natural seeding from adjacent stands.

CLOSED CANOPY: The condition that exists when the canopy created by trees or shrubs or both is dense enough to exclude most of the direct sunlight from the forest floor.

CLOSED ROAD: A national forest road or segment which is restricted from certain types of use during certain seasons of the year. The prohibited use and the time period of closure must be specified. The closure is legal when the Forest Supervisor has issued an order and posted it in accordance with Chapter 36 of the CFR section 261.

COARSE WOODY DEBRIS: Sound and rotting dead woody plant material, standing or fallen, generally greater than 3 inches in diameter. It provides habitat for wildlife and plants and is a source of nutrients and structures for soil protection and development.

CODE OF FEDERAL REGULATIONS (CFR): The official, legal tabulation, or regulations directing federal government activities.

COMMUNITY: A group of one or more populations of plants and animals in a common spatial arrangement; an ecological term used in a broad sense to include groups of various sizes and degrees of integration.

COMPACTION: A physical change in soil properties from compression, vibration, or shearing that increases soil bulk density and decreases porosity, air exchange, root penetration, infiltration, and permeability.

CONTAIN A FIRE: To take suppression action, as needed, which can be reasonably be expected to check the fire's spread under prevailing conditions. (Obsolete terminology)

CONTROLLED BURNING: See Prescribed Burning.

CONTROL LINE (Fire Line): An inclusive term for all constructed or natural fire barriers and treated fire edge used to control a fire.

CONIFER: Any of a group of needle and cone-bearing evergreen trees, typically referring to gymnosperms.

CONVECTION COLUMN: The thermally produced, ascending column of gases, smoke, and debris produced by a fire.

CORRIDORS: An area through which species can move from one place to another over time in response to changes in environment or as a natural part of their life history.

COST: The negative or adverse effects or expenditures resulting from an action. Costs may be monetary, social, physical, or environmental in nature.

COUNCIL OF ENVIRONMENTAL QUALITY (CEQ): An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their affect on the environment, conducts environmental studies, and advises the President on environmental matters.

COVER: Vegetation used by wildlife for protection from predators, breeding, and rearing of young (hiding cover), or to ameliorate conditions of weather (thermal cover).

CROWN FIRE: A fire that advances from the top to top of trees or shrubs more or less independently of the surface fire. Sometimes crown fires are classed as either dependent or independent, to distinguish the degree of independence from the surface fire's influence. See crown out.

CULTURAL RESOURCES: The physical remains of human activity (e.g., artifacts, ruins, burial mounds, petroglyphs, etc.) having scientific, prehistoric, or social values.

CUMULATIVE EFFECT: The impact on the environment which results from the incremental impact of past, present, and reasonably foreseeable actions. Cumulative impacts can also result from individually minor but collectively significant actions over a period of time.

DECADENT: Deteriorating; when used in reference to the conditions of groups of trees, there are inferences of the loss of trees from the overstory and of the presence of disease, or indications of loss of vigor in dominant trees.

DECIDING OFFICER: The Forest Service employee who has the authority to select and/or carry out a specific planning action. May also be referred to as the "Responsible Official".

DECOMMISSION: To remove those elements of a road or buildings that reroute hillslope drainage and present slope stability hazards – *synonym* hydrologic obliteration.

DEGRADATION: This occurs when a stream has excess energy and more sediment leaves a reach than enters it. This is associated with channel scouring.

DENNING SITE: A place of shelter for an animal; also where an animal gives birth and raises young.

DETRIMENTAL SOIL CONDITION: The condition where established soils quality standards are not met and the result is a significant change in soil quality.

DESIGNATED ROADS AND TRAILS: Specific roads and trails identified by the agencies where some type of motorized vehicle use is appropriate and allowed either yearlong or seasonally.

DESIRED NON-NATIVE SPECIES: Those species of plants or animals, that are not indigenous to an area but which represent an important social or economic benefit.

DESIRED FUTURE CONDITION: A portrayal of the land or resource conditions which are desired to result in the future with, or without active management.

DEVELOPED RECREATION: Recreation that occurs where improvements enhance recreation opportunities and accommodate intensive recreation activities in a defined area.

DEVELOPED RECREATION SITES: Relatively small, distinctly defined areas where facilities are provided for concentrated public use (i.e., campgrounds, picnic areas, and swimming areas).

DIRECT EFFECTS: Effects on the environment which occur at the same time and place as the initial cause or action.

DISPERSED RECREATION: Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are more for access and protection of the environment than for the comfort and convenience of the people.

DISPLACEMENT (Soil Displacement): The removal and horizontal movement of soil from one place to another, usually by mechanical forces such as dozer blades, repeated vehicular traffic, or the yarding of logs.

DISTURBANCE: Any event which affects the structure, function, composition, and/or successional development of a plant community (e.g., fire, insect attack, windthrow, timber harvest).

DIURNAL: Daily, especially pertaining to cyclic actions which are completed within 24 hours, and which recur every 24 hours, such as temperature, relative humidity and wind.

DIVERSITY: The relative distribution and variety of plant and animal communities and species within an area.

DOWN WOODY MATERIAL: A component of forest habitats used by wildlife for feeding, denning, and shelter.

DUFF: The partially decomposed organic material of the forest floor beneath the litter or freshly fallen twigs, needles and leaves. See litter.

ECOBURN: A prescribed fire for which at least one objective is to restore or enhance the condition of an area by approximating the results of a fire burning under conditions of the natural fire regime.

ECOSYSTEM: A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

ECOSYSTEM MANAGEMENT: Scientifically based land and resource management that integrated ecological capabilities with social values and economic relationships, to produce, restore, or sustain ecosystem integrity, values, and services over the long term.

EFFECTIVE GROUND COVER: Effective ground cover consists of vegetation, fine organic matter, coarse woody material, and rock fragments larger than three-fourths inch in diameter in contact with the soil surface.

EFFECTIVE WIND SPEED: The mid-flame wind speed adjusted for the upslope effect on fire spread.

EFFECTS: Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

ELK HABITAT EFFECTIVENESS (EHE): An index of the capability of an area to provide protection for elk. It is based on the density of roads open to public motorized use per square mile.

ELK SECURITY AREA: A contiguous block of cover over 250 acres in size and at least 1/2 mile from an open road.

ENDANGERED SPECIES: Any plant or animal species which is in danger of extinction throughout all or a significant portion of its range (Endangered Species Act of 1973).

ENDEMIC: Native or characteristic of a particular geographic area.

ENVIRONMENTAL ANALYSIS: An analysis of proposals and their predictable environmental effects, including physical, biological, economic, and social consequences and their interactions; short and long-term effects; and direct, indirect, and cumulative effects.

ENVIRONMENTAL ASSESSMENT (EA): A concise public document which serves to: (a) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a Finding of No Significant Impact; (b) aid in agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary; and (c) facilitate preparation of an environmental impact statement when necessary.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A detailed statement prepared by the responsible official in which a major federal action which significantly affects the quality of the human environment is described, alternatives to the proposed action provided, and effects analyzed.

EPHEMERAL STREAMS: Streams that flow only as a direct response to rainfall or snowmelt events. They have no baseflow.

EPIDEMIC: The populations of plants, animals, and diseases that buildup, often rapidly, to highly abnormal and generally injurious levels and affect a large number of the host population throughout an area at the same time.

EROSION: Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is much more rapid than normal, natural, or geologic erosion, primarily as a result of the influence of activities of people, animals, or natural catastrophes.

EXTREME FIRE BEHAVIOR: Implies a level of wildfire behavior characteristics that ordinarily precludes methods of direct attack. One or more of the following is usually involved: High rates of spread; prolific spotting and or crowning; presence of fire whirls; a strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment, behaving erratically and sometimes dangerously.

FILL SLOPE: Road construction slopes that are made by depositing soil from excavated areas.

FINE FUELS: Fuels such as grass, needles, fern, tree moss, some slash types & leaves which ignite readily and are consumed rapidly when dry. Also called flash fuels.

FINE ORGANIC MATTER: Organic materials such as plant litter, duff, and woody material less than 3 inches in diameter in contact with the soil.

FIRE BEHAVIOR: The manner in which a fire reacts to the influences of fuel, weather, and topography.

FIRE INTENSITY: The rate of heat release for an entire fire at a specific point in time.

FIREBRAND: Any source of heat, natural or manmade, capable of igniting wildland fuels. Flaming or glowing fuel particles that can be carried naturally by wind, convection currents, or by gravity into unburned fuels.

FIRE CYCLE: (Also called Fire Return Interval) The average time between fires in a given area.

FIRE-DEPENDENT: Forests, grasslands, and other ecosystems historically composed of species that evolved with and are maintained by periodic fire.

FIRE GROUP: Coniferous vegetation with a similar fire response, fire behavior, and plant response.

FIRE HAZARD: The rapid ignition of fuels dependent on arrangement, volume, and conditions to sustain fire.

FIRE INTENSITY: The rate of heat release for an entire fire at a specific point in time. See fireline intensity.

FIRE LINE: The part of a control line that is scraped or dug to mineral soil. Sometimes referred to as a fire trail. See control line.

FIRELINE INTENSITY: The rate of heat energy released during combustion per unit length of fire front. It is usually expressed in BTUs/second/foot.

FIRE MANAGEMENT PLAN: A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans. (NWCG terminology adopted 06/12/97)

FIRE REGIME: The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, seasonality, and extent in an ecosystem. Examples include: nonlethal, lethal (stand-replacing), and mixed lethal.

FIRE REGIME CONDITION CLASS: Departure from natural vegetation and disturbance regimes.

FIRE RISK: The chance that a fire will ignite as affected by the nature and incidence of causative agents (also see Fire Hazard).

FIRE SEASON: The period or periods of the year during which wildland fires are likely to occur, spread and do sufficient damage to warrant organized fire suppression activities.

FIRE SEVERITY: **Soil impacts** (BAER Handbook, FSH 2509.13)**:**

High Severity – More than 40% of the polygon exhibits soil features likely to significantly increase runoff and erosion (e.g., absence of duff layer, hydrophobic soils, and soil discoloration). High severity fires are lethal to conifers with all needles burned off of the trees.

Moderate Severity – Less than 40% of the polygon exhibits high severity indicators. Duff layers may be absent or mostly absent. Moderate severity fire kill the majority of conifers and needles on trees are scorched (brown).

Low Severity – Duff layers are burned but intact. Unburned areas are intermingled with lightly burned areas. Low severity fires cause some tree mortality (torching) but stands have a notable live tree component.

Low Severity – green islands with spotty underburn. May find fire damage on only small dense pockets of regeneration within understory. Overstory basically has minor to no bole char and minor to no crown scorch.

FIRE SEVERITY: Vegetation impacts: For this project, the following vegetation severity definitions were used:

High Severity – total bole charring and no needles remain on trees

Medium Severity – heavy bole char, greater than 10 feet in height and on all sides of the tree. Crown scorch damage (or radiant heat damage) of 70% or greater of the crown with a minimum of 30% live crown remaining. Medium severity effects can be found as a thin strip between the high severity areas and moderately low to low severity areas as well as in larger size pockets.

Moderately Low – light underburn throughout with some crown scorching (scorch on less than 10 to 30% of the crown), small amount of bole char less than 4 feet in height and char could be around entire tree or only partially circle the tree bole.

Low Severity – green islands with spotty underburn. May find fire damage on only small dense pockets of regeneration within understory. Overstory basically has minor to no bole char and minor to no crown scorch.

FIRE-TOLERANT: A plant which has properties or characteristics which enable it to survive fire.

FIRE USE: The combination of wildland fire use and prescribed application of fire to meet resource objectives.

FISH HABITAT: The place where a population of fish species lives and its surroundings; provides life requirements such as food and cover.

FISHERY: The total population of fish in a stream or body of water and the physical, chemical, and biological factors affecting that population.

FLAME LENGTH: The distance measured from the tip of the flame to the middle of the flaming zone at the base of the fire. It is measured on a slant when the flames are tilted due to the effects of wind and/or slope.

FLOODPLAIN: The lowland and relatively flat areas adjoining inland and coastal waters, including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

FOREST COVER TYPE: A descriptive classification of actual or potential forest or forest land defined by its vegetative composition and/or locality factors.

FOREST PLAN: Refers to the various Forest Plans for each national forest, or specifically to the Bitterroot National Forest Plan.

FOREST HEALTH: The condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity while providing for human needs and values. It is a useful way to communicate about the current condition of the forest, especially with regard to resiliency, a part of forest health that describes the ability of the ecosystem to respond to disturbances. Forest health and resiliency can be described, in part, by species composition, density, and structure.

FRAGMENTATION: The process of removing links between areas of habitat suitable for a species, or the reduction of contiguous blocks of vegetation with similar structure and form into smaller isolated parts.

FUEL BED: An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

FUEL LOAD: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area, usually expressed in tons per acre.

FUEL MOISTURE (FMC): The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212F.

FUEL REDUCTION: Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

FUEL TYPE: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions. Also referred to as fuel model.

FUELS MANAGEMENT: Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

FUELS TREATMENT: The rearrangement or disposal of fuels to reduce the fire hazard.

GROUND FIRE: Fire that consumes the organic material beneath the surface litter.

GROUND FUELS: All combustible fuels lying beneath the ground surface including deep duff, roots, rotten buried logs, peat and other woody debris.

HABITAT: A place that provides seasonal or year round food, water, shelter, and other environmental conditions for an organism, community, or populations of plants or animals.

HABITAT COMPONENT: A simple part or a relatively complex entity regarded as a part, or an area or type of environment in which an organism or biological population normally lives or occurs.

HABITAT DIVERSITY: The variation in types, sizes, and shapes of landscape elements or vegetation types.

HABITAT EFFECTIVENESS: The ability of an area to support a species (individual or population) based on a potential of 100%.

HABITAT TYPE: The land area capable of supporting a single plant association. Provides a way to classify land area.

HABITAT TYPE GROUP: A grouping of habitat types based on similarities in natural disturbance regimes, successional patterns and structural characteristics of mature stands.

HANDPILE and BURN: Fuels treatment method used to reduce hazardous fuels concentrations. Material is piled by hand. Piles are burned under conditions when the risk of fire spread is minimal.

HAZARD: A fuel complex defined by kind, arrangement, volume, condition, and location that form a special threat of ignition or suppression difficulty.

HAZARD QUOTIENT: An estimate of herbicide exposure based on the ratio of the amount of received from a particular exposure scenario to the estimated dose.

HIDING COVER: Vegetation capable of hiding 90% of a standing adult deer or elk at 200 feet or less. Includes some shrub stands and all forested stand conditions with adequate tree stem density or shrub layer to hide animals. In some cases, topographic features also can provide hiding cover.

HYDROLOGIC FUNCTION: Soil hydrologic function is the ability of the soil to absorb, store, and transmit water, both vertically and horizontally. Changes in soil bulk density, soil structure, and ground cover can alter the hydrologic function of the soil.

HYDROLOGIC UNIT CODE (HUC): The United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.

IMPROVEMENT CUT: Removing trees of undesirable species, form, or condition from the main canopy in stands past the sapling stage to improve the composition and quality of the remaining stand.

INDIRECT EFFECTS: Secondary effects which occur in locations other than where the initial action occurs or significantly later in time.

INFISH (Inland Native Fish Strategy): On July 31, 1995, the Decision Notice for Inland Native Fish Strategy Environmental Assessment (INFISH) was signed. This strategy was developed to provide interim direction to protect habitat and populations of native resident fish until longer-term conservation strategies such as the Upper Columbia River Basin and federal recovery plans replaced it .

INITIAL ATTACK: An aggressive suppression action consistent with firefighter and public safety and values to be protected.

INTERDISCIPLINARY TEAM (ID Team): A group of resource professionals with different expertise that collaborate to develop and evaluate resource management proposals. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately address resource management activities.

INTERMEDIATE TREATMENT: Any treatment or tending designed to enhance growth, quality, vigor, and composition of the stand after establishment or regeneration and prior to final harvest. Thinning, salvage, and improvement cuts are all types of intermediate treatments.

INTERMITTENT STREAM: A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow. An intermittent stream shows clear evidence of annual scour. Gullies that washed out during flood events are not considered intermittent streams.

INVENTORIED ROADLESS AREA: Undeveloped areas typically exceeding 5,000 acres that met the minimum criteria for wilderness consideration under the Wilderness Act and that were inventoried during the Forest Service's Roadless Area Review and Evaluation (RAREII) process, subsequent assessments, or Forest planning.

IRREVERSIBLE: A term that describes the loss of future options. Applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods of time.

IRRETRIEVABLE: A term that applies to the loss of production, harvest, or use of natural resources. For example, some or all of the timber production from an area is lost irretrievably while an area is serving as a winter sports site. The lost production is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume timber production.

ISSUE INDICATORS: Units of measure developed to facilitate comparison of major issues.

JACKPOT BURNING: A fuel reduction/site preparation treatment in which a continuous fuel bed is not present. Jackpot burning is conducted when fuels tend to be scattered with isolated accumulations distributed across the treatment unit.

LADDER FUELS: Fuels that can carry a fire from the surface layer into the aerial fuel layer. This may include dense seedling/sapling size trees, dense tall brush and shrubs, heavy concentrations of coarse wood debris.

LANDSLIDE PRONE AREAS: Areas which have a tendency toward instability (e.g., very steep slopes on erosive soils, old landslides, and areas with springs).

LANDTYPE: A unit of land with similar designated soil, vegetation, geology, topography, climate, and drainage. The basis for mapping units in the land systems inventory.

LARGE WOODY DEBRIS (LWD): Branches and/or tree trunks located within a stream channel, originating from trees growing in or near the channel. Such material is considered "large" if it is of sufficient size that it remains at least partially submerged during all but major flood events. These materials are important in stream systems because they serve a variety of functions related to channel hydraulics and morphology. In mountain streams, LWD is very important because it provides excellent hiding cover and forms pools, which are the best fish habitats. Functions would include flow energy reduction due to friction and turbulence on downstream side of debris, and sediment storage on upstream side of materials. LWD is delivered to stream channels by decay and/or windfall of trees in close proximity.

LETHAL FIRES: A descriptor of fire response and effect in forested ecosystems of high-severity or severe fire that burns through the overstory and understory which consumes large woody surface fuels and may consume entire duff layer.

LITTER: The uppermost layer of loose debris composed of freshly fallen or slightly decomposed organic materials such as dead sticks, branches, twigs, and leaves or needles.

MANAGEMENT AREA: Geographic areas, not necessarily contiguous, which have common management direction, consistent with the Forest Plan allocations.

MANAGEMENT INDICATOR SPECIES (MIS): A fish or wildlife species selected for monitoring because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

MANAGEMENT IGNITED FIRE: See Prescribed Burning. (Obsolete terminology)

MASS EROSION (MASS WASTING): Downslope movement of a unit of soil. Mass erosion includes landslides, debris flows, debris avalanches, debris torrents, slumps, and soil creeping.

MATURE: In forested vegetation, individual trees or stands of trees that in general are at their maximum rate in terms of physiological processes expressed as height, diameter, and volume growth. In the context of wildlife, refers to mature forest habitat with characteristics needed to provide habitat for species such as pine marten and pileated woodpecker (generally occurs around age 100).

MITIGATION: Actions to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.

MIXED SEVERITY: Units that have a combination of high, moderate, and low degrees of severity and may depend on fuel loading and placement.

MONITORING AND EVALUATION: The evaluation of Forest Plan management practices to determine how well objectives are being met, as well as the effects of those management practices on the land and environment.

MOTOR VEHICLE: Any vehicle which is self-propelled, other than:

(1) a vehicle operated on rails; and
(2) any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area.

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS): A legal limit on the level of atmospheric contamination. The level is established as the concentration limits needed to protect all of the public against adverse effects on public health and welfare, with an adequate safety margin. Primary standards are those related to health effects. Secondary standards are designed to protect the public welfare from effects such as visibility reduction, soiling, material damage, and nuisances.

NATIONAL ENVIRONMENTAL POLICY ACT: A United States environmental law that established a U.S. national policy promoting the enhancement of the environment and also established the President's Council on Environmental Quality (CEQ).

NATIONAL FOREST MANAGEMENT ACT (NFMA): A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development.

NATIVE SPECIES: Those plant and animal species indigenous to the planning or assessment area.

NEW ROAD CONSTRUCTION: Activity that results in the addition of Forest classified or temporary road miles.

NONCOMMERCIAL THINNING: A thinning done purely as an investment in the future growth of a stand. Tree thinned are small in size and usually have no value. Material thinned may be left in place, piled and piles burned, or extracted based on management objectives Noncommercial thinning could also include release thinnings, weeding thinnings, improvement cuttings and pruning.

NON-LETHAL FIRES: A descriptor of fire response and effect in forested ecosystems of low severity or cool fire. Has minimal impact on the site. It burns in surface fuels consuming only the litter, herbaceous fuels, foliage, and small twigs on woody undergrowth. Little heat travels downward through the duff.

NONSTOCKED: A stand of trees or aggregation of stands that have a stocking level below the minimum specified for meeting the prescribed management objectives.

NOXIOUS WEEDS: Rapidly spreading plants which can cause a variety of major ecological impacts to both agricultural and wild lands. A plant species designated as possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States. According to the Federal Noxious Weed Act (PL 93-639) a noxious weed is one that causes disease or has other adverse effects on people or their environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

OFF-HIGHWAY VEHICLE: Any motorized wheeled vehicle designed for cross-country travel over any type of terrain.

FOREST SERVICE OFF-ROAD VEHICLE DESIGNATIONS:

Open: Areas and trails on which all types of motorized vehicles may be operated off roads without restrictions.

Restricted: Areas and trails on which motorized vehicle use is restricted by times or specified in orders issued under the authority of 36 CFR 261 or by law.

Closed: Areas and trails on which all motorized vehicle use is prohibited, except by permit, under authority of 36 CFR 361 or by law.

OLD-GROWTH HABITAT: Old-growth is a distinct successional stage in the development of a forest stand that has special significance for wildlife, generally characterized by:

large diameter trees (often exceeding 19" dbh) with a relatively dense, often multilayered canopy;
the presence of large, standing dead or dying trees;
down and dead trees;
stand decadence associated with the presence of various fungi and heartrots;
an average age often in excess of 200 years.

OPEN ROAD DENSITY: A measure of the amount of open roads per area of land, usually expressed as miles per square mile.

OVERSTOCKED: Stands that exceed a prescribed standard based on the capability of the site and/or other values.

OVERSTORY: The portion of trees in a forest which forms the uppermost layer of foliage.

PARTICULATE MATTER (PM): Any liquid or solid particles. "Total suspended particulates" as used in air quality are those particles suspended in or falling through the atmosphere. They generally range in size from 0.1 to 100 microns.

PATCH: An area of vegetation that is relatively homogeneous internally with respect to composition and successional stage and that differs from what surrounds it.

PEAK FLOW: The greatest flow attained during the melting of the winter snowpack.

PERENNIAL STREAMS: Streams that flow continuously throughout the year.

POLES: A size category for forested vegetation in which trees are usually between 5 inches in diameter up to 9 inches in diameter.

PRESCRIBED BURNING OR PRESCRIBED FIRE: Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and spread required to attain planned and approved resource management objectives. Also called controlled burning or formerly referred to as management ignited prescribed fire. A written, approved prescribed fire plan must exist and, requirements of the National Environmental Policy Act must be met, prior to ignition. (NWCG terminology adopted 06/12/97)

PRESCRIBED NATURAL FIRE (PNF): A naturally occurring fire which is managed under prescribed conditions and allowed to "run its' course" without endangering public safety or significant resource losses. (Obsolete terminology)

PRESCRIPTION - Fire: Measurable criteria that guide selection of appropriate management response and actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social or legal considerations. (NWCG terminology adopted 06/12/97)

PRESCRIPTION - Vegetation: See Silviculture Prescription definition.

PREVENTION OF SIGNIFICANT DETERIORATION (PSD): A program identified by the Clean Air Act to prevent air quality and visibility degradation and to remedy existing visibility problems. Areas of the country are grouped into three classes which are allowed certain degrees of pollution depending on their uses. National Parks and Wilderness areas meeting certain criteria are “Class I” or “clean areas” in that they have the smallest allowable increment of degradation.

PROJECT AREA: The geographic area of activities proposed in the alternatives.

PROJECT FILE: An assemblage of documents that contains all the information developed or used during an environmental analysis. The Project File becomes part of the administrative record for judicial review in case of legal action.

PROPOSED ACTION: In terms of the National Environmental Policy Act, the project, activity, or action that a federal agency intends to implement or undertake and which is the subject of an environmental analysis.

PUBLIC PARTICIPATION: A Forest Service process designed to broaden the information base upon which agency decisions are made by: (1) informing the public about Forest Service activities, plans, and decisions; and (2) encouraging public understanding and participation in the planning processes which lead to final decision-making.

PUBLIC ISSUE (PUBLIC CONCERN): A subject or question of widespread public interest relating to management of the National Forest System.

RATE OF SPREAD (ROS): The relative activity of a fire in extending its horizontal dimensions over time. Expressed as a rate of increase of the total perimeter of the fire, as a rate of forward spread of the fire front, or as a rate of increase in area, depending upon the intended use of the information. Usually it represents the forward spread and is expressed in chains per hour or meters per hour for a specific period in the fire's history.

REACH: A segment of a stream that contains similar physical characteristics (e.g., gradient, width, stream bottom materials). In general, most reaches are between 1 mile and 3 miles in length.

RECORD OF DECISION: A concise public document disclosing the decision made following preparation of an EIS and the rationale used by the Deciding Officer to reach that decision.

RECREATION OPPORTUNITY SPECTRUM (ROS): A range of possible combinations of recreation activities, settings, and experience opportunities, from Primitive to Urban, arranged along a continuum. Classes of recreation on the spectrum are:

> **Primitive (PRIM)** - Area is characterized by essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other area users is minimal. The area is managed to be essentially free from evidence of man-induced restrictions and controls. Motorized use within the area is not permitted.
>
> **Non-Motorized (SPNM)** - Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is not permitted.
>
> **Semi-Primitive motorized (SPM) -** Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often

evidence of other area users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted.

Roaded Natural Appearing (RNA) - Area is characterized by predominantly natural-appearing environment with moderate evidences of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in the construction standards and design facilities.

Rural (R) - Area is characterized by substantially modified natural environment. Resource modification and utilization practices are primarily to enhance specific recreation activities and to retain vegetative cover and soil. Sights and sounds of man are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorized use and parking are available.

Urban (U) - Area is characterized by substantially urbanized environment though the background may have a natural appearance. Resource modification and utilization practices enhance specific recreation activities. Vegetation cover is often exotic and manicured. Sights and sounds of humans are predominant. Large numbers of users can be expected both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

REFERENCE DOSAGE: A very conservative toxicological threshold of chronic herbicide exposure that assumes daily exposure over a 70-year lifespan.

REGENERATION: The renewal of a tree crop, whether by planting or natural means. This term may also refer to the crop (i.e., seedlings, saplings) itself.

REGENERATION HARVEST: Used in reference to even aged treatment such as clearcut, seedtree, and shelterwood harvest methods which remove an existing stand to prepare a site for regeneration.

REHABILITATION (Soil): - Treatments that restore vital soil functions to their inherent range of variability. It is recognized that treatments may need to occur over a period of years and may need to be maintained. Restoration treatments could include but are not limited to, tillage, ripping, seeding, mulching, recontouring, and water barring.

RELEASE THINNING: Freeing a tree from immediate competition by cutting or otherwise eliminating growth that is overtopping or closely surrounding the tree. May be done for incidental disease control work, release of natural and planted regeneration, and accompanying work to eliminate related fuel accumulations.

RESERVE TREE: Trees retained after the regeneration period (pole-sized or larger) under the clearcutting, seed tree, or shelterwood methods.

RESIDUAL TREE: Trees remaining after an activity or disturbance event.

RESPONSIBLE OFFICIAL: The Forest Service line officer who has the authority and responsibility to oversee the planning process and make decisions on proposed actions. May also be referred to the Deciding Official.

RESTORATION (Forest): Holistic approach taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes. Deliberate alteration of ecological patterns and processes to recreate presumed sets of natural, pre-disturbance ecosystem conditions. Restored forests are therefore similar in structure, function and composition to historic forests. Generally refers to the process of enabling the system to resume it resiliency to disturbance.

RESTORE: Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy forestlands, rangelands, and aquatic systems; a variety of management-induced activities

dominate the landscape. Generally, "restore" strategies are applied to areas of moderate to low ecological integrity.

RILL/GULLY: A channel or miniature valley cut by concentrated runoff, through which water commonly flows only during and immediately after heavy rains or during the melting of snow.

RIPARIAN AREAS/HABITATS: Land where the vegetation and microclimate are influenced by perennial and/or intermittent water.

RIPARIAN HABITAT CONSERVATION AREA (RHCA): As established by the Inland Native Fish Strategy, RHCAs are portions of watersheds where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines. Examples of RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems.

RIPARIAN MANAGEMENT OBJECTIVE (RMO): Objectives specified by the Inland Native Fish Strategy regarding how Riparian Habitat Conservation Areas are to be managed. These objectives apply to factors such as pool frequency, large woody debris, mean-maximum temperature, and mean wetted width-depth ratios.

ROAD: A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary.

> **Classified Road:** Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service.
>
> **Arterial Road:** A Forest road that provides service to a large land area and usually connects with other arterial roads or public highways.
>
> **Collector Road:** A Forest road that serves smaller land areas than an arterial road, and usually connects Forest arterial roads to local Forest roads or terminal facilities.
>
> **Local Road:** A Forest road that connects terminal facilities with Forest collector, Forest arterial, or public highways. Usually Forest local roads are single purpose transportation facilities.
>
> **Temporary Road:** Roads authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be part of the forest transportation system and not necessary for long-term resource management.
>
> **Unclassified Road:** Roads on National Forest System lands that are not managed as part of the Forest transportation system, such as unplanned **roads**, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization.

ROAD DENSITY: Number of miles of open road per square mile.

ROAD MAINTENANCE: The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective.

ROADED NATURAL RECREATION SETTING: A classification on the recreation opportunity spectrum where timber harvest or other surface use practices are**: -** evident. Motorized vehicles are permitted on all or parts of the road system.

ROSGEN STREAM TYPE CLASSIFICATION: A system of measure that utilizes various channel features to rate a stream or river into reproducible classes.

ROTATION: The planned number of years required to establish (including a regeneration period) and grow timber crops to a specified condition

RUTTING: Deformation of the soil under saturated conditions resulting in detrimental changes to soil structure and reduced porosity.

SALMONIDS: Members of the family of elongate soft-finned fishes Salmonidae - the trout and salmon family.

SALVAGE: Removal of trees that are dead, dying, deteriorating, or in danger of being killed by injurious agents. A manageable stand still remains after a salvage treatment.

SANITATION: The removal of dead, damaged, or insect and disease susceptible trees to prevent the spread of pests or pathogens.

SAWLOG: A log that meets minimum regional standards of diameter, length, and defect, intended for sawing.

SAWTIMBER: Trees containing at least one 8-foot piece with a 5.6 inch diameter inside bark at the small end and meeting Regional specification for defect percentage. Trees must be at least 6.9 inches in diameter at breast height for all species except lodgepole pine which will be 6 inches at breast height.

SCOPING: The procedures by which the Forest Service collects input in the environmental analysis process. This information is used to determine: the extent of analysis necessary; the range of actions, alternatives, and impacts to be addressed; the significant issues related to the proposed action; and the depth of environmental analysis, data, and task assignments needed.

SEDIMENT: Any material carried in suspension by water, which will ultimately settle to the bottom. Sediment has two main sources: from the stream channel area itself and from disturbed sites.

SEDIMENT (DEPOSITION) – See Aggregation (Deposition)

SEDIMENT TRAP: Any natural or man-made feature in a stream that traps sediment.

SEED TREE METHOD: Removal of the mature timber in one cutting, except for a small number of seed trees left singly or in small groups.

SEEDLING AND SAPLINGS: A size category for forested stands in which trees are less than 5 inches in diameter.

SENSITIVE SPECIES: Those species identified by the Regional Forester for which population viability is a concern as evidenced by significant current or predicted downward trends in (a) population numbers or density, or (b) habitat capability that would reduce a species' existing distribution.

SENSITIVITY LEVEL: A particular degree or measure of viewer interest in the scenic qualities of the landscape.

SUCCESSIONAL STAGE (Seral Stage): The series of plant community conditions that develop during ecological succession from bare ground (or major disturbance) to the climax stage. *Early seral stage* is a condition in which plants are present soon after a disturbance or at the beginning of a new successional process (seedling or saplings in a forest). Grass, herbs, or brush are abundant, diversity is high. A *mid-seral stage* is characterized in a forest setting has almost full crown closure in pole-to medium-sized trees. Understory vegetation and species diversity is less due to tree shading. A *late seral stage* is a condition with mature trees, often of old forest character. Tree growth has slowed, mortality has increased, understory forage is minimal, structural diversity may be high, and species diversity is generally less.

SHELTERWOOD METHOD: Removal of the mature timber in a series of cuttings, which extend over a relatively short portion of the rotation, by means of which the establishment of essentially even-aged reproduction under the partial shelter of seed trees is encouraged.

SIGNIFICANT: As used in NEPA, requires consideration of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole, and the affected region, interests, and locality. Intensity refers to the severity of impacts (40 CFR 1508.27).

SILVICULTURE: The art and science of manipulating forest vegetation to meet a desired future condition based on land management objectives.

SILVICULTURE DIAGNOSIS: The processes of comparing existing stand conditions to a desired condition or “target stand”, and determining a need for treatment to bring the stand to the desired condition, based on land management objectives.

SILVICULTURE PRESCRIPTION: A detailed written document that describes management activities needed to implement silvicultural treatment or treatment sequence. The prescription documents the results of an analysis of present and anticipated site conditions and management direction. It also describes the desired future vegetation conditions in measurable terms. The desired condition is a basis for treatment, monitoring, and evaluation.

SILVICULTURAL SYSTEM: A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. The system name is based on the number of age classes (e.g., even-aged, two aged, uneven-aged) or the regeneration method (e.g., clearcutting, seed tree, shelterwood, selection) used.

SLASH: Debris left on the ground after treatment activities and/or as a result of storm or fire damage. The term slash usually refers to small diameter seedlings, saplings, poles, logs, branches, stumps, and/or broken understory trees or brush.

SLASH DISPOSAL: Treatment of slash to reduce the fire hazard or for other purposes.

SLASHING: Slashing consists of felling and/or limbing small diameter vegetation to improve residual tree growth, vigor and healthy or to prepare an area for underburning where ladder fuels may be a problem. Slashing may be done in conjunction with other treatments including thinnings, piling, and burning.

SMOKE MANAGEMENT PLAN: A forecast issued daily during specific periods advising fire managers of atmospheric conditions with special emphasis on elements which will affect the dispersal of pollutants from a fire.

SNAG: A dead, standing tree.

SNAG-DEPENDENT WILDLIFE: Wildlife species that are dependent on standing dead trees for nesting or roosting habitat or for food.

SOIL FUNCTION: Primary soil functions are: (1) the sustenance of biological activity, diversity, and productivity, (2) soil hydrologic function, (3) filtering, buffering, immobilizing, and detoxifying organic materials, and (4) storing and cycling nutrients and other materials.

SOIL PRODUCTIVITY: The capacity of a soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture and nutrients and length of growing season.

SOIL QUALITY: The capacity of a specific soil function within its surroundings, support plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation.

SPECIES: A unit of classification of plants and animals consisting of the largest and most inclusive array of sexually reproducing and cross-fertilizing individuals which share a common gene pool.

SPECIES VIABILITY: A species consisting of self-sustaining and interacting populations that are well distributed through the species' range. Self-sustaining populations are those that are sufficiently abundant and have sufficient genetic diversity to display the array of life history strategies and forms to provide high likelihood for their long-term persistence and adaptability over time.

STAND: A community of trees or other vegetation uniform in composition, constitution, spatial arrangement, or condition to be distinguishable from adjacent communities.

STAND COMPOSITION: The unique representation of tree species and structural characteristics of any forest stand.

STAND DENSITY: Refers to the number of trees growing in a given area. Can be expresses in terms of trees per acre, basal area per acre, stand density index and/or other measures.

STAND-REPLACING FIRE: A fire that kills most or all of a stand of trees.

STAND STRUCTURE: The horizontal and vertical arrangement of the vegetation in a stand. The components of stand structure might include tree diameter, heights, crown layers, number of stems, shrubs, herbaceous understory, snags, and down logs.

STANDARD: A particular action, level of performance, or threshold specified by the Forest Plan for resource protection or accomplishment of management objectives. Unlike "guidelines" which are optional, standards specified in the Forest Plan are mandatory.

STATE IMPLEMENTATION PLANS: A plan required by the Clean Air Act and prepared by an Air Quality Regulatory Agency, which describes how the state will attain and maintain air quality so as to not violate National Air Ambient Air Quality Standards.

STOCKING: A measure of tree density as it relates to an optimum or desired density to achieve a given management objective.

STREAM: A natural watercourse of perceptible extent that has a generally sandy or rocky bottom or definite banks and that confines and conducts continuously or intermittently flowing water. "Perceptible extent" means that 50% of a 100-foot segment meets the definition of a stream (Montana Streamside Management Law).

STREAM CHANNEL STABILITY: A classification system that utilizes ocular estimates of various channel, bank, and riparian area features to evaluate channel health.

STRUCTURAL DIVERSITY: The variation in sizes and shapes of landscape elements, as well as diversity of pattern (i.e., heterogeneity).

SUBPOPULATION: A geographically distinct segment of a larger population. For example, the bull trout in Mill Creek area subpopulation of the larger bull trout population in the entire Bitterroot River Drainage.

SUCCESSION: A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as seral stages, refer to seral stage definition.

SUCCESSIONAL STAGE: A stage or recognizable condition in the gradual supplanting of one community of plants by another.

SUMMER RANGE: range, usually at higher elevation, used by deer and elk during the summer; a summer range is usually much more extensive than a winter range.

SUPPRESSED: Refers to individual trees which are growing very slowly. The trees have their crowns in the lower layers of the canopy and the leading shoots are not free.

SUPPRESSION (FIRE SUPPRESSION): Any act taken to extinguish, slow, or stop a fire beginning with its discovery. Examples of suppression activities include fireline construction, backfiring, and applying water or chemical fire retardants.

SURFACE EROSION: The detachment and transport of individual soil particles by wind, water, or gravity. Surface erosion is the loss of soil in a fairly uniform layer across the land surface (sheet erosion), in many small rills, or as larger gullies.

SURFACE FIRE: Fire that burns surface litter, other loose debris and small vegetation.

SURFACE FUELS: All materials lying on, or immediately above, the ground, including needles or leaves, duff, grass, small dead wood, downed logs, stumps, large limbs, low brush and reproduction.

TARGET STAND: A description of individual forest stands that reflects the desired future attributes and conditions that have the potential to meet management objectives.

THERMAL COVER: Vegetation used by animals to modify the adverse effects of weather. A forest stand that is a least 40 feet in height with tree canopy cover of at least 70 percent provides thermal cover. These stand conditions are achieved in closed sapling-pole stands and by all older stands unless the canopy cover is reduced below 70 percent. Deciduous stands may serve as thermal cover in summer, but not in winter.

THINNING: Intermediate cuttings that are aimed primarily at controlling growth of stands through adjustments in stand density. Thinning can be categorized as commercial or non-commercial.

THIN-FROM-BELOW: Removing trees from the lower crown classes to favor those in the upper crown classes.

THREATENED SPECIES: Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all of a significant portion of its range.

TIMBER BASE: The lands within the Forest that are suitable for timber production.

TIMBER PRODUCTION: The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use.

TIMBER STAND IMPROVEMENT: A loose term comprising all intermediate cuttings made to improve the compositions and condition of the timber stand.

TIMBER TYPES: Refer to Forest Cover Type definition.

TORCHING: Fire burning principally as a surface fire that intermittently ignites the crowns of trees or shrubs as it advances.

TRAIL: A commonly used term denoting a pathway for purposes of travel by foot, stock, or trail vehicles.

TURBIDITY: An optical measure of how fine sediment inhibits light transmission in a given water sample due to scattering and absorption by suspended particles.

UNDERBURN: A fuel reduction/site preparation treatment in which surface fuels are ignited under controlled conditions and are allowed to burn with specified parameters. Underburns are usually conducted in areas where the fuel bed is fairly continuous and conditions are such that fire will spread in a predictable and consistent fashion. Underburning implies that there is a live overstory present and often a live understory as well. Prescriptions for underburning usually include an acceptable mortality level in the live component.

UNDERSTORY: Vegetation (e.g., trees or shrubs) growing under the canopy formed by taller trees.

UNEVEN-AGED MANAGEMENT: The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

UNIT: A treatment area that may undergo activity such as harvest, salvage, burning, or other purposes that is specified within boundaries.

UNMERCHANTABLE: Timber that does not meet minimum height and diameter specifications which would make it suitable for commercial sawtimber.

UNROADED AREAS: Any area without the presence of a classified road (i.e., a road at least 50 inches wide and constructed or maintained for vehicle use) of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas do not overlap with inventoried roadless areas.

VALUES AT RISK: Natural resources, improvements, or other values that may be jeopardized if a fire occurs.

VEGETATION RESPONSE UNITS (VRU): Refer to Habitat Type Group definition.

VERTICAL DIVERSITY: The diversity in an area that results from the complexity of the above ground structure of the vegetation; the more tiers of vegetation or the more diverse the species makeup is, the higher the degree of vertical diversity.

VIABLE POPULATION: A wildlife population of sufficient size to maintain its existence over time in spite of normal fluctuations in population levels.

VISUAL QUALITY OBJECTIVE (VQO): A system of indicating the potential expectations of the visual resource by considering the frequency an area is viewed and the type of landscape. VQOs are listed below:

Maximum Modification: Human activities may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

Modification: Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as natural occurrence when viewed in foreground or middleground.

Partial Retention: Human activity may be evident but must remain subordinate to the characteristic landscape.

Retention: Human's activities are not evident to the casual Forest visitor.

Preservation: Provides for ecological change only.

Variety Class: Diversity of the landscape character.

Sensitivity Level: A particular degree or measure of viewer interest in the scenic qualities of the landscape.

VISUAL RESOURCE: The composite of landforms, water features, vegetative patterns, and cultural features which create the visual environment.

WATER YIELD: The measured output of the Forest's streams.

WEEDING THINNING: The elimination or suppressing undesirable vegetation, mainly herbaceous, during the seedling stage of a forest crop so as to reduce competition with the seedling stand. May also include incidental disease control work, release of natural and planted regeneration, and accompanying work to eliminate related fuel accumulations.

WETLANDS: Those areas that are inundated by surface or ground water with a frequency sufficient, under normal circumstances, to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands include marshes, bogs, sloughs, potholes, river overflows, mud flats, wet meadows, seeps, and springs.

WHOLE TREE YARDING: During timber harvesting, entire trees are yarded to the landing. Tops, limbs, and other unmerchantable material is piled for later treatment and/or utilization at the landing site.

WILDERNESS: All lands included in the National Wilderness Preservation System by public law; generally defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation.

WILDLAND-URBAN INTERFACE (WUI): Includes those areas of resident human populations at imminent risk from wildland fire, and human developments having special significance. These areas include developments and structures that if destroyed by fire, would result in hardships to individuals and communities. These areas encompass not only the sites themselves but also the continuous slopes and fuels that lead directly to the sites, regardless of the distance involved.

WINTER RANGE: A range, usually at lower elevation, used by migratory deer and elk during the winter months. It is usually better defined and smaller than summer range.

WOODY DEBRIS RECRUITMENT: The process of trees naturally falling over and landing in stream channels.

YEAR-ROUND CLOSURE: Gate, earthen barrier, or sign closing a road or area all year long. These areas are sometimes open during harvest or other land management activities.

YARDING: A method of bringing material to a roadside or landing, for transport. Methods include forms of skyline cabling, ground-based skidding, balloon, and helicopter.

ABBREVIATIONS AND ACRONYMS

AIRFA	American Indian Religious Freedom Act
ALT	Alternative
APE	Area of Potential Effect
ARM	Administrative Rule of Montana
ARPA	Archaeological Resource Protection Act
ATV	All-terrain Vehicle (also OHV or ORV)
BA	Basal Area; refers to forest management
BA	Biological Assessment; refers to ESA
BACT	Best Available Control Technology
BAER	Burned Area Emergency Response
BARC	Burned Area Reflectance Classification
BMPs	Best Management Practices
BRC	Bitterroot Restoration Committee
CAA	Clean Air Act
CCF	100 Cubic Feet
CDC	Centers for Disease Control
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
CFS	Cubic Feet Per Second
CMAI	Culmination of Mean Annual Increment
CWA	Clean Water Act
CWD	Coarse Woody Debris
DBH	Diameter at Breast Height (at 4.5ft.)
DEIS	Draft Environmental Impact Statement
DPS	Distinct Population Segment
DSD	Detrimental Soil Disturbance
EA	Environmental Assessment
ECA	Equivalent Clearcut Area
EHE	Elk Habitat Effectiveness
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FACTS	Forest Activity Tracking System
FEIS	Final Environmental Impact Statement
FMU	Fire Management Units
FP	Forest Plan
FRCC	Fire Regime Condition Class
FSH	Forest Service Handbook
FSM	Forest Service Manual
FWS/USFWS	United States Fish & Wildlife Service
GAO	General Accounting Office
GIS	Geographical Information System
HD	Hunting District
HFRA	Healthy Forests Restoration Act
HG	Habitat Group
HQ	Hazard Quotient
HSI	Habitat Suitability Index
HUC	Hydrologic Unit Code
ICBEMP	Interior Columbia Basin Ecosystem Mgmt Project
ID Team	Interdisciplinary Team
IMPLAN	Employment and Income Impacts Model
IMPROVE	Interagency Monitoring Protected Visual Environments
INFISH	Inland Native Fish Strategy
KOC	Soil Absorption Coefficient
LAU	Lynx Analysis Unit
LC_{50}	Lethal Concentration
LCAS	Lynx Conservation Assessment Strategy
LEO	Law Enforcement Officer
LMUs	Landtype Mapping Units
LTB	Lake Tahoe Basin
LTSP	Long-term Site Productivity Project
LWD	Large Woody Debris
MA	Management Area
MBF	Thousand Board Feet
MDEQ/DE	Montana Department of Environmental
MIS	Management Indicator Species
MMBF	Million Board Feet
MNHP	Montana Natural Heritage Program
MTFWP	Montana Fish, Wildlife & Parks
MTSHPO	Montana State Historic Preservation Office
MVUM	Motor Vehicle Use Map
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System
NFMA	National Forest Management Act
NFS	National Forest System
NFSR	National Forest System Road
NHPA	National Historic Preservation Act
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
NRCS	Bitterroot National Forest Soil Survey
NRHP	National Register of Historic Places
NRM	Northern Rocky Mountains
NTU	Non-turbulent Unit
OHV	Off-highway Vehicle
ORV	Off-road Vehicle
OSHA	Occupational Safety & Health Administration
PF	Project File
PIBO	PACFISH/INFISH Biological Opinion
PM2.5	Fine Particulate Matter
PM10	Coarse Particulate Matter
PNV	Present Net Value
PSD	Prevention of Significant Deterioration
R1 SQS	Region 1 Soil Quality Standards
RAs	SERA Human Health and Ecological Risk Assessments
RARE II	Roadless Area Review and Evaluation
RAVG	Remote Sensing Program
RfD	Reference Dosage
RHCA	Riparian Habitat Conservation Area
RMO	Riparian Management Objective
RNA	Research Natural Area
ROS	Recreation Opportunity Spectrum
RUPs	Restricted Use Pesticides
SERA	Syracuse Environmental Research Associates

SGR	Subsoiling Grapple Rake
SHPO	State Historic Preservation Officer
SIO	Scenic Integrity Objectives
SIP	State Implementation Plans
SIS	Smoke Impact Sheet
SMZ	Streamside Management Zone
SWCPs	Soil and Water Conservation Practices
TEA	Transaction Evidence Appraisal
TES	Threatened and Endangered Species
TLM	Track Line Machine
TMDL	Total Maximum Daily Loads
TSA	Timber Sale Administrator
TSMRS	Timber Stand Management Record System
$\mu g/m^3$	Microgram per cubic meter
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	USDI-Fish & Wildlife Service
VQO	Visual Quality Objectives
VRU	Vegetation Response Unit
WEPP	Water Erosion Prediction Project
WQLS	Water Quality Impaired Streams
WUI	Wildland Urban Interface

APPENDIX E

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The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

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